5-6115-434-12

TM 5-6115-434-12

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL

POWER UNIT, UTILITY PACK, GAS TURBINE ENGINE DRIVEN (AIRESEARCH MODEL PPU85-5) NON-WINTERIZED FSN 6115-937-0929 (AIRESEARCH MODEL PPU85-4) WINTERIZED FSN 6115-134-0825

This reprint includes all changes in effect at the time of publication; changes 2 through 6 and 8.

HEADQUARTERS, DEPARTMENT OF THE ARMY

DECEMBER 1968

D101.11:

READEX FICHE best copy available

SAFETY PRECAUTONS

BEFORE OPERATION

If battery electrolyte is spilled on skin or clothing, immediately wash with cold water or a sodium bicarbonate solution to prevent severe skin burns or damage to clothing.

Do not use lifting equipment with capacity of less than 5000 pounds. Do not allow power unit to swing back and forth when it is suspended. Failure to observe this warning may result in severe injury or death to personnel or damage to equipment.

Do not use fork lift with capacity of less than 5000 pounds. Do not allow power unit to rock excessively on fork lift. Failure to observe this warning may result in severe injury or death to personnel or damage to equipment.

DURING OPERATION

The emergency operation switch must be in OFF position, with the red lockout guard in the closed (down) position. It should be used only in extreme emergencies when need for continued operation justifies risk incurred in loss of equipment and possible injury to personnel.

Operators working in the area of equipment generating high frequency noises, especially if such equipment is operating in a confined area, will be required to wear ear plugs, supplemented by ear protectors. See your safety or medical officer for examination requirements and federal stock number for ear plugs and ear protectors.

In case of accident from electrical shock, shut down power unit at once. If power unit cannot be shut down, free victim from live conductor with a board or any nonconductor. If victim is unconscious, apply artificial respiration and obtain medical help.

AFTER OPERATION

Electrical power shall be shut off prior to maintenance on electrical components.

Electrical power to the gas turbine engine shall be disconnected before starting maintenance on generator.

Have suitable hoisting or support equipment attached to generator as injury to personnel and equipment may result if hoisting is attempted without required equipment.

Do not remove the igniter plug or ignition unit unless they have been grounded. The high tension lead must be grounded as it is removed from the igniter plug. Ground by touching the contact spring in the lead to the igniter.

Changes in force: C2, C3, C4, C5, C6 and C8

CHANGE
No. 8

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *3 May 1978*

Operator and Organizational Maintenance Manual:

POWER UNIT, UTILITY PACK, (MUST) GAS TURBINE ENGINE DRIVEN (AIRESEARCH MODEL PPU85-5) NON-WINTERIZED NSN 6115-00-937-0929 (AIRESEARCH MODEL PPU-85-4) WINTERIZED, NSN 6115-00-134-0825

TM 5-6115-434-12, 13 December 1968, is changed as follows:

Title is changed as shown above.

Page 2 of cover. In Safety Precautions the first two lines of Before Operation are changed to read:

Either lead-Acid or Nickel-Cadmium batteries may be used in this equipment. Injury or death may result if the Potassium Hydroxide electrolyte is added to the Lead-Acid Battery. Do not add Sulphuric Acid electrolyte to Potassium Hydroxide Battery.

Battery acid is very corrosive. Wear rubber gloves, apron and face shield when working on batteries. If battery electrolyte is spilled on clothing or other material, wash immediately with clean water. If spilled on personnel, start flushing the affected area immediately with large amounts of clean water. Continue flushing until medical assistance arrives.

Page 1-1. Paragraph 1-2*b* is changed to read:

b. You can improve this manual by calling attention to errors and by recommeding improvements and stating your reasons for the recommendations. Your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), should be mailed to Commander, U. S. Army Troop Support and Aviation Materiel Readiness Command, ATTN: DRSTS-MTPS, 4300 Goodfellow Blvd., St. Louis, MO 63120. A reply will be furnished directly to you.

Pages 2-1, paragraph 2-1a. The following two warnings are added before 2-1*b. Battery Servicing.*

WARNING

Either Lead-Acid or nickel-cadmium batteries may be used in this equipment. Injury or death may result if the Potassium Hydroxide electrolyte is added to the Lead-Acid Battery. Also, do not add Sulphuric Acid to the Nickel-Cadmium Battery.

WARNING

Battery Electrolyte is very corrosive. Wear rubber gloves, apron and face shield when handling leaking batteries. If battery electrolyte is spilled on clothing or other material, wash immediately with clean water. If spilled on personnel, start flushing the affected area immediately with large amounts of clean water. Continue flushing until medical assistance arrives.

Page 2-1. Paragraph 2-1*b* is superseded as follows:

b. Battery Servicing.

NOTE

The power plant is shipped in two different configurations, non-winterized and winterized. The non-winterized unit has lead-acid batteries

---

[*] This Change supersedes C7, 15 February 1978.

and will operate down to -25°F. The winterized unit has Nickel-Cadmium batteries and will operate down to -65°F.

CAUTION

Tools and test equipment used to service the Lead-Acid battery must not be used to service the Nickel-Cadmium Battery.

Tools and test equipment used to service the Nickel-Cadmium battery must not be used to service the Lead-Acid battery.

(1) ***Used Batteries.***

(a) Lead-Acid battery.

1. Open battery access and storage compartment door (fig. 1-1), remove wingnuts securing battery cover and remove cover (fig. 2-1).

2. Remove battery vent caps and add pure distilled water to battery cells until proper electrolyte level is reached. If batteries do not have electrolyte level markers,add distilled water until electrolyte level is 3/8 inch above cell plates.

WARNING

If battery electrolyte is spilled on skin or clothing, immediately wash with cold water or a sodium bicarbonate solution to prevent severe skin burns or damage to clothing.

CAUTION

Avoid spilling battery electrolyte on paintedsurfaces. Damage to painted surfaces may result.

3. Check specific gravity of electrolyte in each cell with a hydrometer. Refer to table 2-1 for hydrometer specific gravity temperature corrections. Refer to table 2-2 and establish the state of change of batteries with specific gravity corrected to 80°F. Also, refer to TM 9-6140-200-12.

4. Check that battery vent cap holes are open and install vent caps on batteries.

5. Remove any corrosion from battery terminals or terminal lugs using a solution of Sodium Bicarbonate or an approved cleaning compound. Apply an approved corosion preventive compound to battery terminals and terminal lugs.

6. If batteries are disconnected, connect batteries as shown in figure 2-1, then install battery cover and secure with wingnuts.

(b) Nickel-Cadmium Battery.

1. Open battery access and storage compartment door (fig. 1-1).

2. Refer to TM 1-6140-203-15-3 and service the batteries.

3. Insure batteries are installed and connected.

WARNING

(LEAD-ACID BATTERY)

If battery electrolyte is spilled on clothing, immediately wash with cold water or a sodium bicarbonate solution to prevent severe skin burns or damage to clothing.

CAUTION

Avoid spilling batery electrolyte on painted surface. Damage to painted surfaces may result.

(2) New Batteries.

(a) Lead-Acid Battery. New batteries are normally shipped dry changed. Remove battery vent caps. Add electrolyte of specified specific gravity (1.285 at 65°F.) to level indicated on batteries. If batteries already contain electrolyte, add pure distilled water to each cell until proper electrolyte level is reached. If batteries do not have electrolyte level markers, add distilled water to each cell until electrolyte level is 3/8 inch above cell plates. Check that vent holes in vent caps are open, then install vent caps.

WARNING

Battery electrolyte is very corrosive. Wear rubber gloves, apron and face shield when handling leaking batteries. If battery electrolyte is spilled on clothing or other material, wash immediately with clean water. If spiled on personnel, start flushing the affected area immediately with large amounts of clean water. Continue flushing until medical assistance arrives.

(b) Nickel-Cadmium Batteries.

1. Open battery access and storage compartment door (fig. 1-1).

2. Refer to TM 11-6140-203-15-3 and service the batteries.

3. Insure batteries are installed and connected.

By Order of the Secretary of the Army:

BERNARD W. ROGERS
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Brigadier General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25A, Line A-45, Operator maintenance requirements for MUST System Equipment.

U.S. GOVERNMENT PRINTING OFFICE: 1978-765096/803
GPO 904-218

Changes in force: C6

CHANGE

NO. 6

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D C, *9 May 1977*

Operator and Organizational Maintenance Manual

POWER UNIT, UTILITY PACK, GAS TURBINE ENGINE DRIVEN (AIRESEARCH MODEL PPU85-5) NON-WINTERIZED NSN 6115-00-937-0929 (AIRESEARCH MODEL PPU85-4) WINTERIZED NSN 6115-00-134-0825

TM 5-6115-434-12, 13 December 1968, is changed as follows.

The title is changed as shown above.

The Table of Contents is changed as shown below:

Appendix	A.	Reference	A-1
	B.	Components of End Items List	B-1
	C.	Maintenance Allocation Chart	C-1
	D.	Expendable Supplies and Materials List	D-1

Page 1-1. Paragraph 1-1b is superseded as follows:

b. Appendix A contains a list of publications applicable to this manual. Appendix B contains Components of End Item List. Appendix C contains the Maintenance Allocation Chart. Appendix D contains the Expendable Supplies and Materials List.

Page 1-1. Paragraph 1-2.b is superseded as follows:

b. You can help to improve this manual by calling attention to errors and by recommending improvements. Your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms) and/or DA Form 2028-2 (Recommended Changes to Equipment Technical Manuals), may be used. Please mail your recommended changes directly to Commander, U. S. Army Troop Support Command, ATTN: DRSTS-MPB, 4300 Goodfellow Boulevard, St. Louis, MO. 63120. A reply will be furnished directly to you.

b. The special tools and equipment required to perform Organizational Maintenance on the Power Unit are listed in Table 3-1.

Page 3-1. Paragraph 3-2. Delete the last line, "(When printed)".

Page A-1. Paragraph A-3.Change "TM 9-213" to read: "TM 43-0139".

APPENDIX B
COMPONENTS OF END ITEM LIST

Section I. INTRODUCTION

1. Scope

This appendix lists integral components of and basic issue items for the Power Unit to help you inventory items required for safe and efficient operation.

2. General

The Components of End Item List is divided into the following sections:

a. Section II. Integral Components of the End Item. These items, when assembled, comprise the Power Unit and must accompany it whenever it is transferred or turned in. These illustrations will help you identify these items.

b. Section III. Basic Issue Items. These are minimum essential items required to place the Power Unit in operation, to operate it, and to perform emergency repairs. Although shipped separately packed they must accompany the Power Unit during operation and whenever it is transferred between accountable officers. The illustrations will assist you with hard-to-identify items. This manual is your authority to requisition replacement BII, based on Table(s) of Organization and Equipment (TOE)/Modification Table of Organization and Equipment (MTOE) authorization of the end item.

3. Explanation of Columns

a. Illustration. This column is divided as follows:

(1) Figure Number. Indicates the figure number of the illustration on which the item is shown (if applicable).

(2) Item Number. The number used to identify item called out in the illustration.

b. National Stock Number (NSN). Indicates the National Stock Number assigned to the item and which will be used for requisitioning.

c. Part Number (P/N). Indicates the primary number used by the manufacturer, which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

d. Description. Indicates the Federal item name and, if required, a minimum description to identify the item.

e. Location. The physical location of each item listed is given in this column. The lists are designed to inventory all items in one area of the major item before moving on to an adjacent area.

f. Usable on Code. "USABLE ON" codes are included to help you identify which component items are used on the different models. Identification of the codes used in these lists are:

CODE	USED ON
	(Not Applicable)

g. Quantity Required (Qty Reqd). This column lists the quantity of each item required for a complete major item.

h. Quantity. This column is left blank for use during inventory. Under the Rcv'd column, list the quantity you actually receive on your major item. The Date columns are for use when you inventory the major item at a later date; such as for shipment to another site.

Section II. INTEGRAL COMPONENTS OF END ITEM

(1) ILLUSTRATION		(2)	(3)	(4)	(5)	(6)	(7)	(8) QUANTITY			
(a) FIGURE NO.	(b) ITEM NO.	NATIONAL STOCK NO.	PART NO. & FSCM	DESCRIPTION	LOCATION	USABLE ON CODE	QTY REQD	RCVD	DATE	DATE	DATE
2-9		6115-00-859-2346	(9403) 13217E4000	Cable Assy, Remote Power	Refrig Cmpt		1				
2-12		6115-00-859-2352	(97403) 13217E3965	Cable Power, DC	Bty Cmpt		1				
2-1		6115-00-843-8612	(97403) 13217E3964	Cable, Power, Bty	Bty Cmpt		1				
2-12		6115-00-871-6709	(97403) 13217E3971	Cable, Power, Standby	Bty Cmpt		1				
2-9		6150-00-863-8595	(97403) 13217E3982	Cable, Power, 400 HZ	Refrig Cmpt		1				
2-9		6150-00-467-2541	(97403) 13217E3983	Cable, Power, 60 HZ	Refrig Cmpt		1				
			(97403) 13200E2802	Retainer, Duct	Cdsr Cmpt		2				
1-9		4130-00-863-8636	(97403) 13217E4038	Duct Assy	Cdsr Cmpt		8				
1-16		4720-00-929-6396	(97403) 13220E4450	Hose, Fuel	Refrig		3				
3-7		2835-00-854 4799	(97403) 13217E3954	Filter, Fuel	Refrig Cmpt		1				
1-16		4720-00-574--7902	(97403) 13217E3962	Hose, Vacuum	Bty Cmpt		1				
1-16		4720-00-010-4442	(97403) 13220E2740	Hose, Compressed Air	Bty Cmpt		1				
1-16		4720-00-003-0980	(97403) 13217E4033	Hose, Water Supply	Refrig Cmpt		1				
1-16		4720-00-003-0981	(97403) 13217E8816	Hose, Water Recirc	Bty Cmpt		2				
1-16		4720-00-003-0979	(09403) 13217E4059	Hose, Dual Water	Evap Cmpt		1				
			(97403) 13217E4106	Partition, Evap	Bty Cmpt		1				
		6115-00-138 8127	(97403) 13220E5242	Cover, Fabric			1				
			(97403) 1323QE2801	Retainer, Duct	Evap Cmpt		1				
2-3		4210-00-55 8837	(81349) MIL-E-52031	Extinguisher, Fire	Elec Panel		1				
		5305-00-882-8137	(97403) (13217E787	Screw, Swivel	Cdsr Cmpt		4				

Section II. INTEGRAL COMPONENTS OF END ITEM (Con't)

(1) ILLUSTRATION		(2)	(3)	(4)	(5)	(6)	(7)	(8) QUANTITY			
(a) FIGURE NO.	(b) ITEM NO.	NATIONAL STOCK NO.	PART NO. & FSCM	DESCRIPTION	LOCATION	USABLE ON CODE	QTY REQD	RCVD	DATE	DATE	DATE
		5305-00-882-0553	(97403) 13217E3901	Shoe, Swivel	Cdsr Cmpt		4				
2-3		5935-00-791-6302	(97403) 13217E3807-2	Connector, Recep	Elec Panel		1				
		3010-00-861-8090	(97403) 13217E3960	Coupling Assy	Cdsr Cmpt		4				
		2940-00-362-0830	(97403) 13219E952	Element, Fitter	Refrig Cmpt		2				
		2835-00-859-3132	(97403) 13217E4361	Ejector Assy	Bty Cmpt		1				
		5410-00-023-5043	(97403) 13217E794	Manifold Cmpt	Bty		1				
		4210-00-555-8837	(81349) MIL-E-5203	Extinguisher, Fire	Pwr Panel		1				
		7520-00-559-9618		Case, Cotton Duck	Refrig Cmpt		1				
		7510-00-889-3494		Binder, Log Book	Refrig		1				
		5975-00-878-3791	(81349) MIL-R-11461	Rod, Ground	Cond Cmpt		1				

Appendix D is added as follows:

APPENDIX D
EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

1. Scope

This appendix lists expendable supplies and materials you will need to operate and maintain the Power Unit. These items are authorized to you by CTA50-970, Expendable Items (except Medical, Class V, Repair Parts, and Heraldic Items).

2. Explanation of Columns

a. Column 1 - Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, Item 5, App. D").

b. Column 2 - Level. This column identifies the lowest level of maintenance that requires the listed item. (Enter as applicable)

C - Operator/Crew
F - Direct Support Maintenance
O - Organizational Maintenance
H - General Support Maintenance

c. Column 3 - National Stock Number. This is the National Stock Number assigned to the item; use it to request or requisition the item.

d. Column 4 - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parenthesis, if applicable.

e. Column 5 - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	C	9130-00-256-8617	Turbine Fuel, JP-4, MIL-J-5624 (1)*	Drum
2	C	9130-00-256-1294	Turbine Fuel, JP-5, MIL-J-5624 (1)*	Drum
3	C	9130-00-967-7002	Fuel, Compression Ignition, (1)* Type 1, MIL-F-46005	Drum
4	C	9140-00-286-5296	Diesel Fuel, DF-2, Fed. VV-F-800 (1)*	Drum
5	C	9140-00-286-5284	Diesel Fuel, DF-A, Fed. VV-F-800 (1)*	Drum
6	C	9140-00-273-2394	Kerosene, Fed. VV-K-211 (1)*	Drum
7	C	9140-00-274-1912	Diesel Fuel, F-75, Mil-F-16884 (1)*	Drum
8	C	9130-00-221-0680	Gasoline, Automotive, MIL-G-3056 (1)*	Drum
9	C	9130-00-221-0684	Gasoline, Aviation, 80/87, (1)* MIL-G-5572	Drum
10	C	9130-00-221-0674	Gasoline, Aviation, 91/96, (2)* MIL-G-5572	Drum
11	C	9130-00-221-0677	Gasoline, Aviation, 100/130, (2)* MIL-G-5572	Drum
12	C	9130-00-221-2375	Gasoline, Aviation, 115/145, (2)* MIL-G-5572	Drum
13	O	9150-00-782-2627	Lubricating Oil, Engine, MIL-L-007808	Qt
14	O	9150-00-985-7099	Lubricating Oil, Engine, MIL-L-27699	Qt
15	F	9150-00-753-4667	Refrigerant Oil, BMS3-7A-81205	Qt
16	F	6830-00-782-6232	Refrigerant, Fed. BB-F-1421, Type 114	Cyl

*(1) Preferred Fuel, (248 Gal. required for 8 hours operation).

*(2) Emergency Fuels, (50 hours continuous operation maximum).

By Order of the Secretary of the Army:

BERNARD W. ROGERS
General, United States Army
Chief of Staff

Official:

PAUL T. SMITH
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25A, Operator maintenance requirements for MUST System.

Changes in force: C 2, C 3, C 4, and C 5

TM 5-6115-434-12
C 5

CHANGE }
No. 5 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *22 January 1975*

Operator's and Organizational Maintenance Manual
POWER UNIT, UTILITY PACK, GAS TURBINE ENGINE DRIVEN (AIRESEARCH MODEL PPU-85-5) NON-WINTERIZED NSN 6115-00-937-0929 (AIRESEARCH MODEL PPU-85-4) WINTERIZED NSN 6115-00-134-0825

TM 5-6115-434-12, 13 December 1968 is changed as follows:
The title is changed as shown above.

NOTE

All "Federal Stock Numbers" appearing in this publication should be corrected to the new "National Stock Numbers" before using. This can be done by inserting -00- after the Federal Stock Class. For example, Federal Stock Number 6115-937-0929 will be corrected to the following National Stock Number: 6115-00-937-0929. Wherever the words "Federal Stock Number" appear throughout the publication, correct to read "National Stock Number."

Page 2 of Cover. Add the following:

BEFORE OPERATION

Do not rely on grounding or safety devices to prevent accidents. Electrical circuits and equipment are potentially hazardous. Personnel should always exercise caution to prevent injury or possible death due to electrical shock.

DURING OPERATION

Operation of this equipment presents a noise hazard to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or ear plugs which were fitted by a trained professional.

AFTER OPERATION

Drycleaning solvent, Fed Spec P-D-680, used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100 F. (38 C.) - 138 F. (59 C.).

Page A-1. Paragraph A-1 is superseded as follows:

A-1. Fire Protection and Safety

TB 5-4200-200-10	Hand Portable Fire Extinguishers Approved for Army Users
TB MED 251	Noise and Conservation of Hearing

By Order of the Secretary of the Army:

FRED C. WEYAND
General, United States Army
Chief of Staff

Official:
VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25 (qty rqr block No. 687) Operator maintenance requirements for Must System.

TM 5-6115-434-12
*C 4

CHANGE }
No. 4 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *29 August 1973*

Operator's and Organizational Maintenance Manual
POWER UNIT, UTILITY PACK, GAS TURBINE ENGINE DRIVEN (AIRESEARCH MODEL PPU-85-5) NON-WINTERIZED
FSN 6115-937-0929)
(AIRESEARCH MODEL PPU85-4) WINTERIZED
FSN 6115-134-0825

Current as of 1 July 1973

TM 5-6115-434-12, 13 December 1968, is changed as follows:

Page i. Table of contents, Appendix B is changed to read:

BASIC ISSUE ITEMS AND ITEMS TROOP INSTALLED OR AUTHORIZED LIST.

Page 1-1. In paragraph 1-1*b*, the second sentence is changed to read "Appendix B contains the basic issue items and troop installed or authorized items lists."

Paragraph 1-2.b is superseded as follows:

b. The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended changes to Publications) and forwarded direct to Commander, US Army Troop Support Command, ATTN: AMSTS-MPP, St. Louis, MO 63120.

Page 1-21. So much of paragraph 1-3*i* as precedes 1-3*i*(1) is changed as follows:

i. Materiel items. The materiel items (fig. 1-16) are used for connecting the utility pack to other elements of the MUST Hospital. These items are shipped with the utility pack on initial issue from the manufacturer and are listed below for identification purposes only. These items are to accompany the utility pack whenever it is transferred.

Page 1-24. In figure 1-16, Sheets 1 of 5 through 5 of 5, the captions are changed to read, "Materiel items."

Page 1-30. Paragraph 1-4*b*(2) *(b)* add the following:

Lubricating oil MIL-L-6085-A

Page 2-12. Paragraph 2-4*a*. The title is superseded as follows:

Disconnection of Materiel Items.

Pages 2-14 through 2-19. In figures 2-8 through 2-12, the legend lines are changed to read, "materiel items" in place of "accessory components" wherever it appears.

Page 2-55. Add paragraph 2-17.1 immediately following paragraph 2-17, as follows:

2-17.1 Cold Weather Starting Procedures

NOTE

The following procedures apply to engines equipped with a winterization kit.

a. Check that the turbine and heater battery activation circuit breakers (fig. 2-3) are pulled out prior to connecting the batteries.

b. Make sure the nickel-cadium batteries are fully charged. Refer to TM 11-6140-203-15-1, -2, and -3.

CAUTION

When servicing or adding water to nickel-cadium type batteries, do not use any hydrometer or syringe that may have come in contact with lead-acid type batteries. Residue acid induced in the electrolyte will destroy the batteries.

c. Connect the batteries.

d. Check that the master switch on the instrument panel (fig. 2-14) is in the STOP position, and the fuel heater switch is in the OFF position.

e. Press in the turbine and heater battery activation circuit breakers on the receptacle panel and wait until the breakers snap out in the OPEN position, then repeat the procedure.

f. Press the fuel heater circuit breaker on the receptacle panel to the CLOSED position. Place the fuel heater switch in the HEAT position. Allow the fuel heater switch to remain on until the fuel is sufficiently warm for starting, as indicated by the illumination of the fuel line heater indicator lamp on the instrument panel. When the fuel is warmed, place the fuel heater switch in the No. 2 battery position.

---

*This change supersedes C 1, 9 May 1969.

g. Start the power plant using normal starting procedures (para 2-14).

Page 3-68. In paragraph 3-61 *a*(3), sentence 4, change "24V ac" to read "24V dc".

In paragraph b (3), sentence 4, change "24V ac" to read "24V dc".

Page A-1. Appendix A is changed as follows:

In paragraph A-3. add the following:

AR740-1	Storage and Supply Activity Operations
AR746-1	Color, Marking, and Preservation of Equipment for Shipment.

In paragraph A-5, lines 1 and 2 are rescinded.

Line 6 is changed to read:

TM 11-6140-203-15-1-2, and 3	Operator's, Organizational, Direct Support, and Depot Maintenance Manual: Aircraft and Nonaircraft Nickel-Cadmium Type Batteries.

Paragraph A-7 is added:

A-7 DEMOLITION

TM 750-244-3	Procedures for Destruction of Equipment to Prevent Enemy Use (Mobility Equipment Command).

Paragraph A-8 is added.

A-8. OPERATION

TM 5-766	Electric Power Generation in the Field

Page B-1. Appendix B is superseded as follows:

APPENDIX B

BASIC ISSUE ITEMS LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED LIST

Section 1. INTRODUCTION

B-1. Scope

This appendix lists items required by the operator for operation of the power unit.

B-2. General

This list is divided into the following sections:

a. Basic Issue Items List — Section II. Not applicable.

b. Items Troop Installed or Authorized List — Section III. A list of items in alphabetical sequence which, at the discretion of the unit commander, may accompany the power unit. These items are not subject to turn-in with the power unit when evacuated.

B-3. Explanation of Columns

The following provides an explanation of columns in the tabular list of items troop installed or authorized, section III.

a. Source, Maintenance and Recoverability Code (SMR). Not applicable.

b. Federal Stock Number. This column indicates the Federal stock number assigned to the item which will be used for requisitioning purposes.

c. Description. This column indicates the Federal item name and any additional description of the item required.

d. Unit of Measure (U/M). A two-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based; e.g., ft, ea, pr; etc.

Quantity Authorized. This column indicates the quantity of the item authorized to be used with the equipment.

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) SMR code	(2) Federal stock number	(3) Description	(4) Unit of meas	(5) Qty auth
	7520-559-9618	CASE: Maintenance and operation Manuals.	ea	1
	4210-012-2507	EXTINGUISHER: Fire	ea	1
	5975-878-3791	ROD ASSEMBLY: Ground	ea	1

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25A (qty rqr block No. 637), Operator Requirements for MUST System

First Fold out Page. Figure 1-8 is superseded as follows:

Charts

End of

Transposed to

Volume.

TM 5-6115-434-12
C 3

CHANGE
No. 3

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *13 January 1971*

Operator and Organizational Maintenance Manual

POWER UNIT, UTILITY PACK, GAS TURBINE ENGINE DRIVEN (AIRESEARCH MODEL PPU-85-5) NON-WINTERIZED, FSN 6115-937-0929, (AIRESEARCH MODEL PPU-85-4) WINTERIZED, FSN 6115-134-0825

TM 5-6115-434-12, 13 December 1968, is changed as follows:

Page 1-18. Paragraph *e*, in line 21, "Pressure switches are utilized to activate the hot and cold water pumps" is changed to: "A pressure switch is utilized to activate the hot water pump".

***Page 1-20.* Figure 1-13 is superseded as follows:**

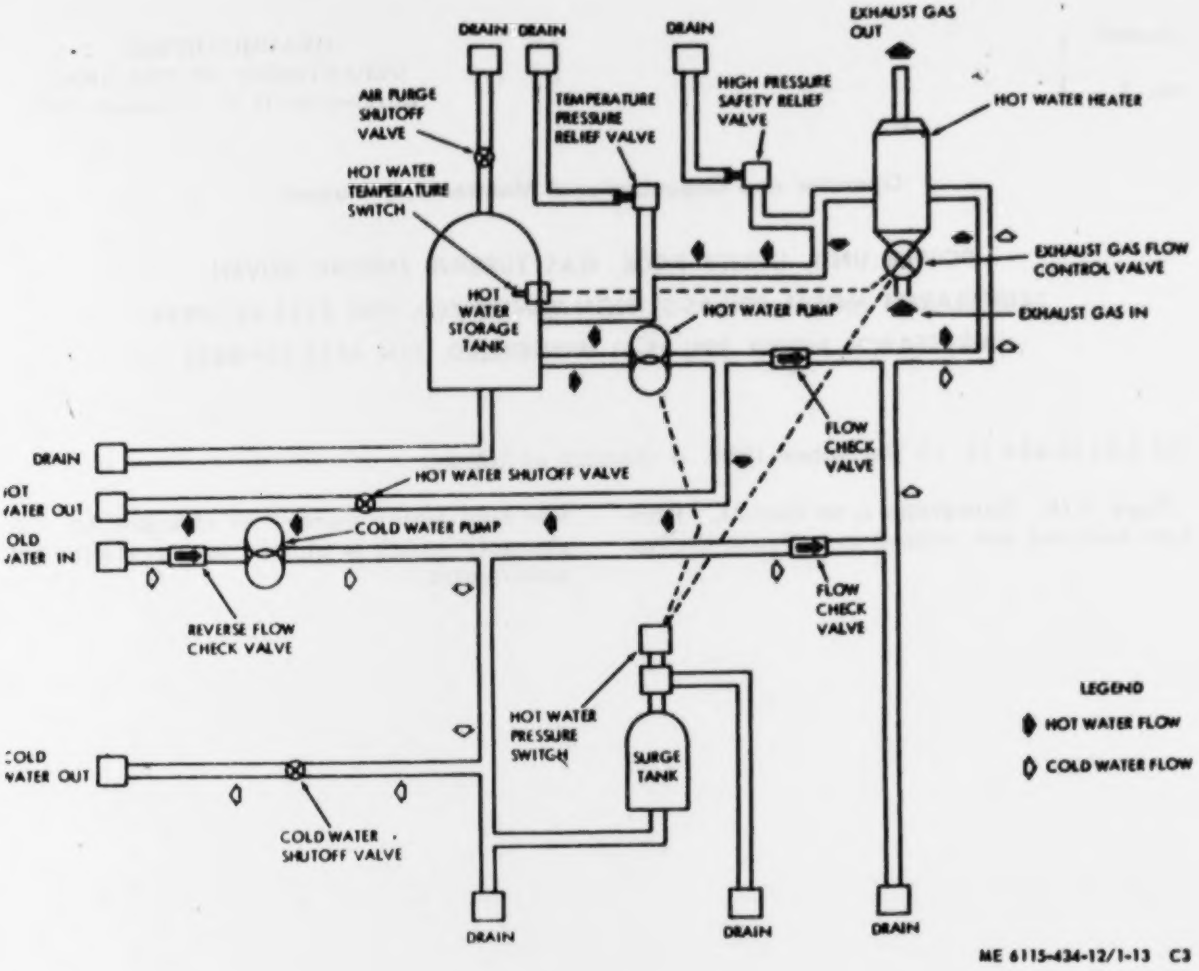
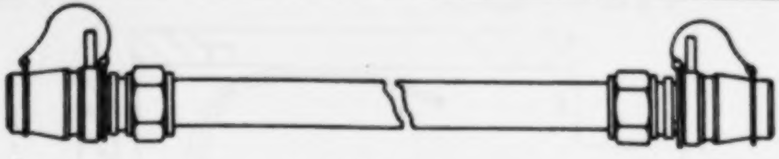
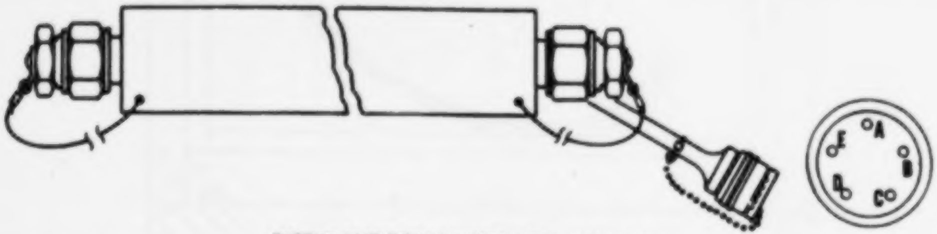

DRAIN
DRAIN
DRAIN
EXHAUST GAS OUT
AIR PURGE SHUTOFF VALVE
TEMPERATURE PRESSURE RELIEF VALVE
HIGH PRESSURE SAFETY RELIEF VALVE
HOT WATER HEATER
HOT WATER TEMPERATURE SWITCH
EXHAUST GAS FLOW CONTROL VALVE
HOT WATER STORAGE TANK
HOT WATER PUMP
EXHAUST GAS IN
FLOW CHECK VALVE
DRAIN
HOT WATER SHUTOFF VALVE
OT
ATER OUT
OLD
ATER IN
COLD WATER PUMP
REVERSE FLOW CHECK VALVE
FLOW CHECK VALVE
LEGEND
◆ HOT WATER FLOW
◇ COLD WATER FLOW
HOT WATER PRESSURE SWITCH
SURGE TANK
OLD
VATER OUT
COLD WATER SHUTOFF VALVE
DRAIN
DRAIN
DRAIN
ME 6115-434-12/1-13 C3

Figure 1-13. Water system schematic.

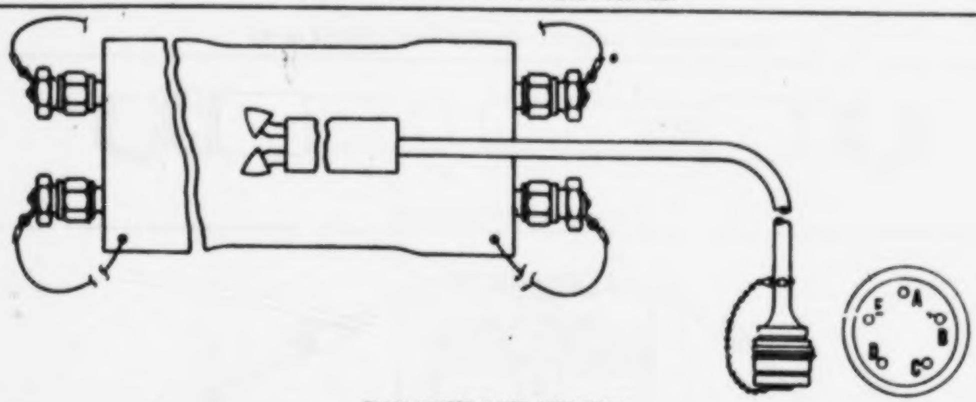
***Page 1-26.* Figure 1-16, sheet 3 of 5, is superseded as follows:**



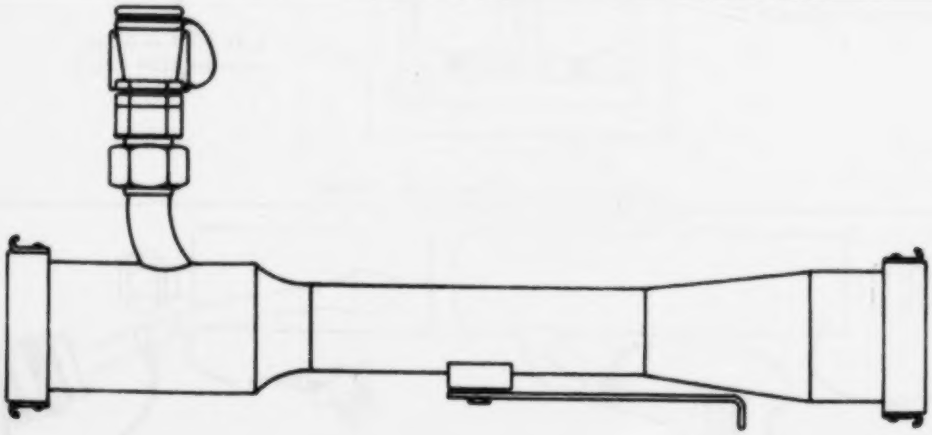
BLEED AIR HOSE ASSEMBLY



SUPPLY AND DRAIN WATER HOSE ASSEMBLY



DUAL WATER HOSE ASSEMBLY

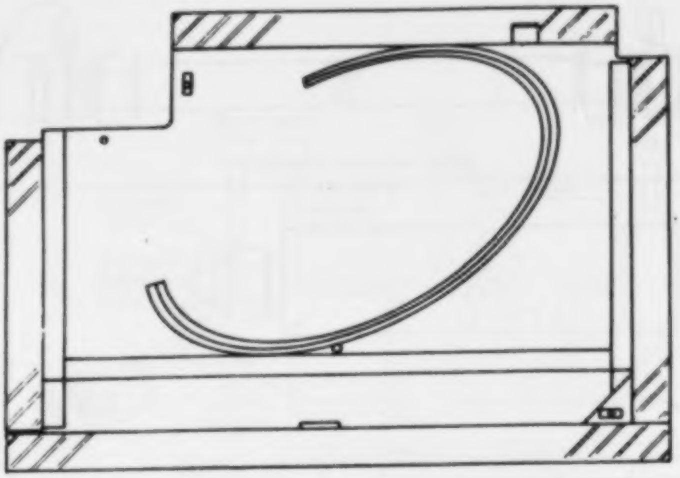


INFLATION AND DEFLATION EJECTOR ASSEMBLY

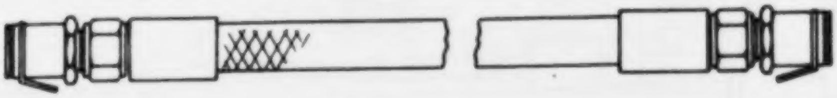
ME 6115-434-12/1-16 ③ C3

Figure 1-16. Accessory components (Sheet 3 of 5).

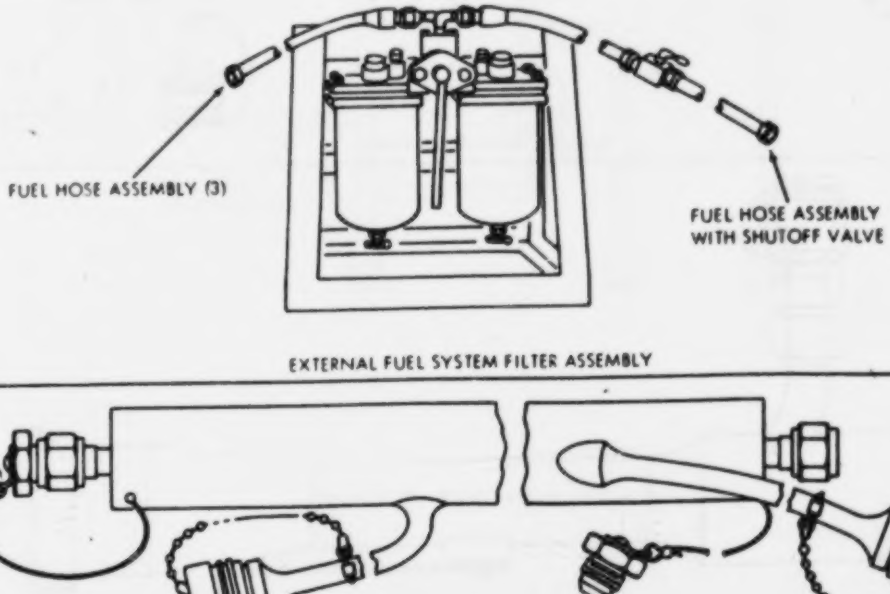
Page 1-28. Figure 1-16, sheet 5 of 5 is, superseded as follows:



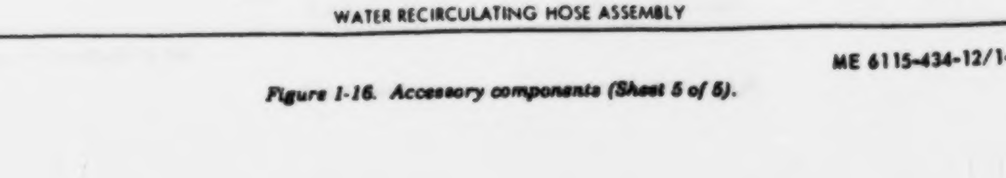
CONDITIONED AIR OUTLET COMPARTMENT DIVIDER PANEL



VACUUM HOSE ASSEMBLY


FUEL HOSE ASSEMBLY (3)
FUEL HOSE ASSEMBLY WITH SHUTOFF VALVE

EXTERNAL FUEL SYSTEM FILTER ASSEMBLY



WATER RECIRCULATING HOSE ASSEMBLY

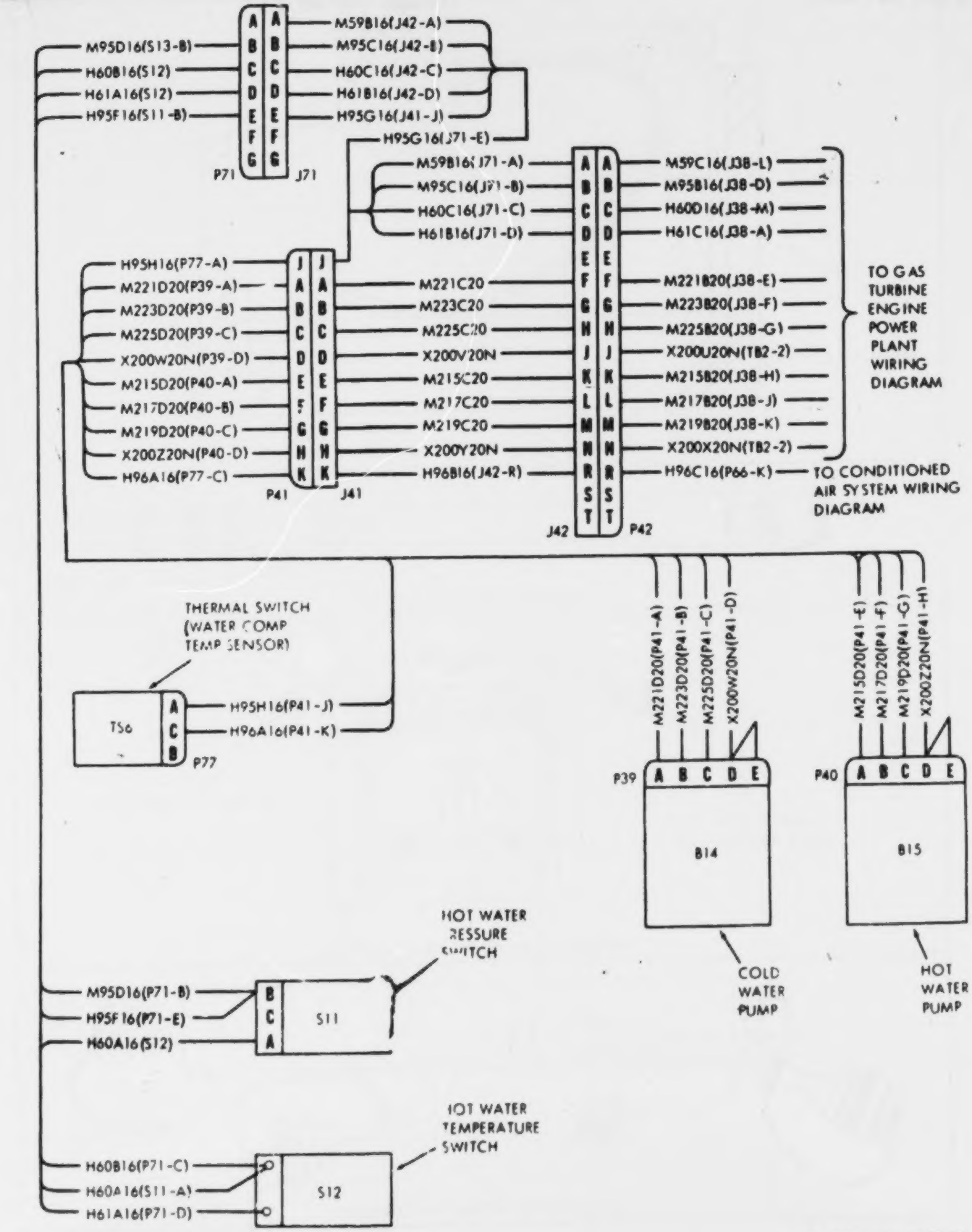
ME 6115-434-12/1-16 ⑤ C3

Figure 1-16. Accessory components (Sheet 5 of 5).

Page 1-29. Paragraph *b*(1), in lines 13 and 18, "4,500 lbs (max)" is changed to "4,550 lbs (max)".

Page 1-31. Paragraph *b*(5), in line 13, "PMG voltage——29 ± 1" is changed to "PMG voltage——39 ± 1".

Page 1-34. **Figure 1-19 is superseded as follows:**



P71
J71
A
B
C
D
E
F
G
M95D16(S13-B)
H60B16(S12)
H61A16(S12)
H95F16(S11-B)
M59B16(J42-A)
M95C16(J42-B)
H60C16(J42-C)
H61B16(J42-D)
H95G16(J41-J)
H95G16(J71-E)
M59B16(J71-A)
M95C16(J71-B)
H60C16(J71-C)
H61B16(J71-D)
J42
P42
R
S
T
M59C16(J38-L)
M95B16(J38-D)
H60D16(J38-M)
H61C16(J38-A)
M221B20(J38-E)
M223B20(J38-F)
M225B20(J38-G)
X200U20N(TB2-2)
M215B20(J38-H)
M217B20(J38-J)
M219B20(J38-K)
X200X20N(TB2-2)
H96C16(P66-K)
TO GAS TURBINE ENGINE POWER PLANT WIRING DIAGRAM
TO CONDITIONED AIR SYSTEM WIRING DIAGRAM
P41
J41
H95H16(P77-A)
M221D20(P39-A)
M223D20(P39-B)
M225D20(P39-C)
X200W20N(P39-D)
M215D20(P40-A)
M217D20(P40-B)
M219D20(P40-C)
X200Z20N(P40-D)
H96A16(P77-C)
M221C20
M223C20
M225C20
X200V20N
M215C20
M217C20
M219C20
X200Y20N
H96B16(J42-R)
THERMAL SWITCH (WATER COMP TEMP SENSOR)
TS6
P77
H95H16(P41-J)
H96A16(P41-K)
M221D20(P41-A)
M223D20(P41-B)
M225D20(P41-C)
X200W20N(P41-D)
M215D20(P41-E)
M217D20(P41-F)
M219D20(P41-G)
X200Z20N(P41-H)
P39
P40
B14
B15
COLD WATER PUMP
HOT WATER PUMP
HOT WATER PRESSURE SWITCH
M95D16(P71-B)
H95F16(P71-E)
H60A16(S12)
S11
HOT WATER TEMPERATURE SWITCH
H60B16(P71-C)
H60A16(S11-A)
H61A16(P71-D)
S12

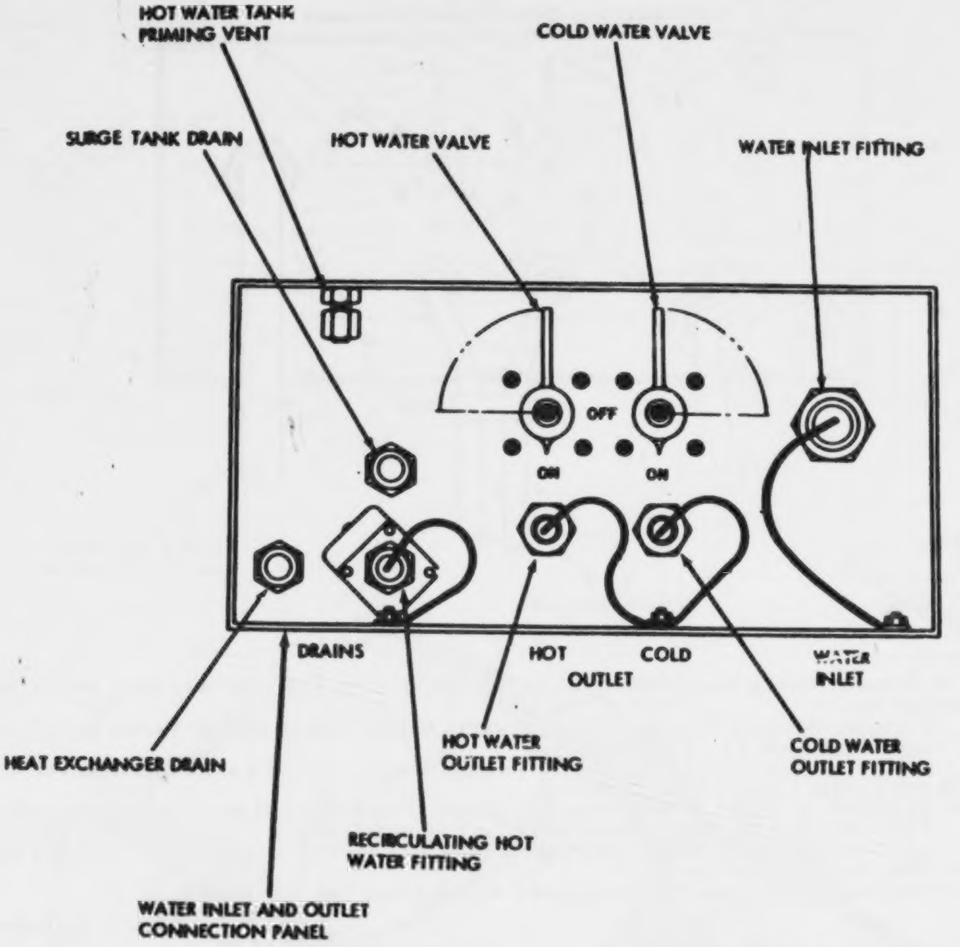
ME 6115-434-12/1-19 C3

Figure 1-19. Water system practical wiring diagram.

Page 1-35. Figure 1-19, legend, in line 6, "S13 Switch (cold water pressure)" is rescinded.

Page 2-9. Paragraph (*i*), in line 7, after "water use" the following is added: "Connect water recirculating hoses to MUST hospital cold water service line and to the cold water supply, and the MUST hospital hot water service line and then back to water service panel at ball valve"

Page 2-10. Figure 2-6 is superseded as follows:


HOT WATER TANK PRIMING VENT
COLD WATER VALVE
SURGE TANK DRAIN
HOT WATER VALVE
WATER INLET FITTING
OFF
ON
ON
DRAINS
HOT
COLD
OUTLET
WATER INLET
HEAT EXCHANGER DRAIN
HOT WATER OUTLET FITTING
COLD WATER OUTLET FITTING
RECIRCULATING HOT WATER FITTING
WATER INLET AND OUTLET CONNECTION PANEL

ME 6115-434-12/2/6 C3

Figure 2-6. Water inlet and outlet connections.

Page 2-12. Paragraph 2-4*a*(3), in line 3, "(fig. 1-16) and supply and drain water hose assembly" is changed to "(fig. 1-16), supply and drain water hose assembly, and water recirculating hoses".

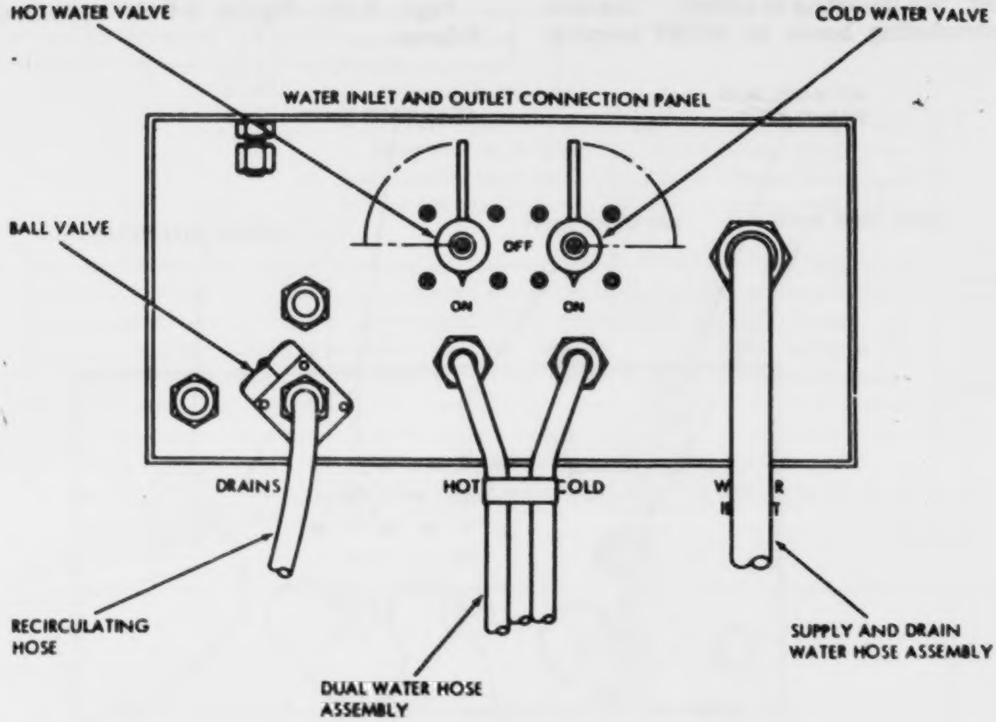
Page 2-13. Paragraph (*a*), in line 3, after "and surge tank drain" the following is added: "Open ball valve on hot water tank drain".

Page 2-33. Figure 2-20, label "MAIN CONTACTOR TRIP INDICATOR LAMP" is changed to "MAIN CONTACTOR SWITCH", and label "MAIN CONTACTOR SWITCH" is changed to "MAIN CONTACTOR TRIP INDICATOR LAMP".

Page 2-34. Paragraph 2-21, "Electrical Output Connection Panel Controls" is changed to paragraph 2-12.

Reproduced from poor document.

Page 2-53. **Figure 2-30, sheet 2 of 2 is superseded as follows:**


HOT WATER VALVE
COLD WATER VALVE
WATER INLET AND OUTLET CONNECTION PANEL
BALL VALVE
OFF
ON
ON
DRAINS
HOT
COLD
RECIRCULATING HOSE
DUAL WATER HOSE ASSEMBLY
SUPPLY AND DRAIN WATER HOSE ASSEMBLY

STEP 5. PLACE HOT WATER VALVE AND COLD WATER VALVE IN ON POSITION AND BALL VALVE IN OPEN POSITION.

STEP 6. TO ENSURE POSITIVE PRIMING, CONNECT VACUUM HOSE TO END OF HOT WATER OUTLET HOSE AND TURN VACUUM VALVE TO ON POSITION.

STEP 7. OBSERVE VACUUM OUTLET AT UTILITY PACK FOR PRESENCE OF WATER AND REMOVE VACUUM LINE AT FIRST INDICATION OF SUCH.

CAUTION: IF WATER DELIVERY IS UNATTAINABLE OR ANY OTHER OBVIOUS MALFUNCTION OCCURS, PLACE PUMP SWITCHES ON INSTRUMENT PANEL IN OFF POSITION AND PLACE HOT WATER VALVE AND COLD WATER VALVE IN OFF POSITION. REFER TO CHAPTER 3, SECTION IV, TROUBLESHOOTING FOR REMEDIAL ACTION.

NOTE: APPROXIMATELY 15 MINUTES IS REQUIRED FOR HEATING THE HOT WATER.

ME 6115-434-12/2-30 ② C3

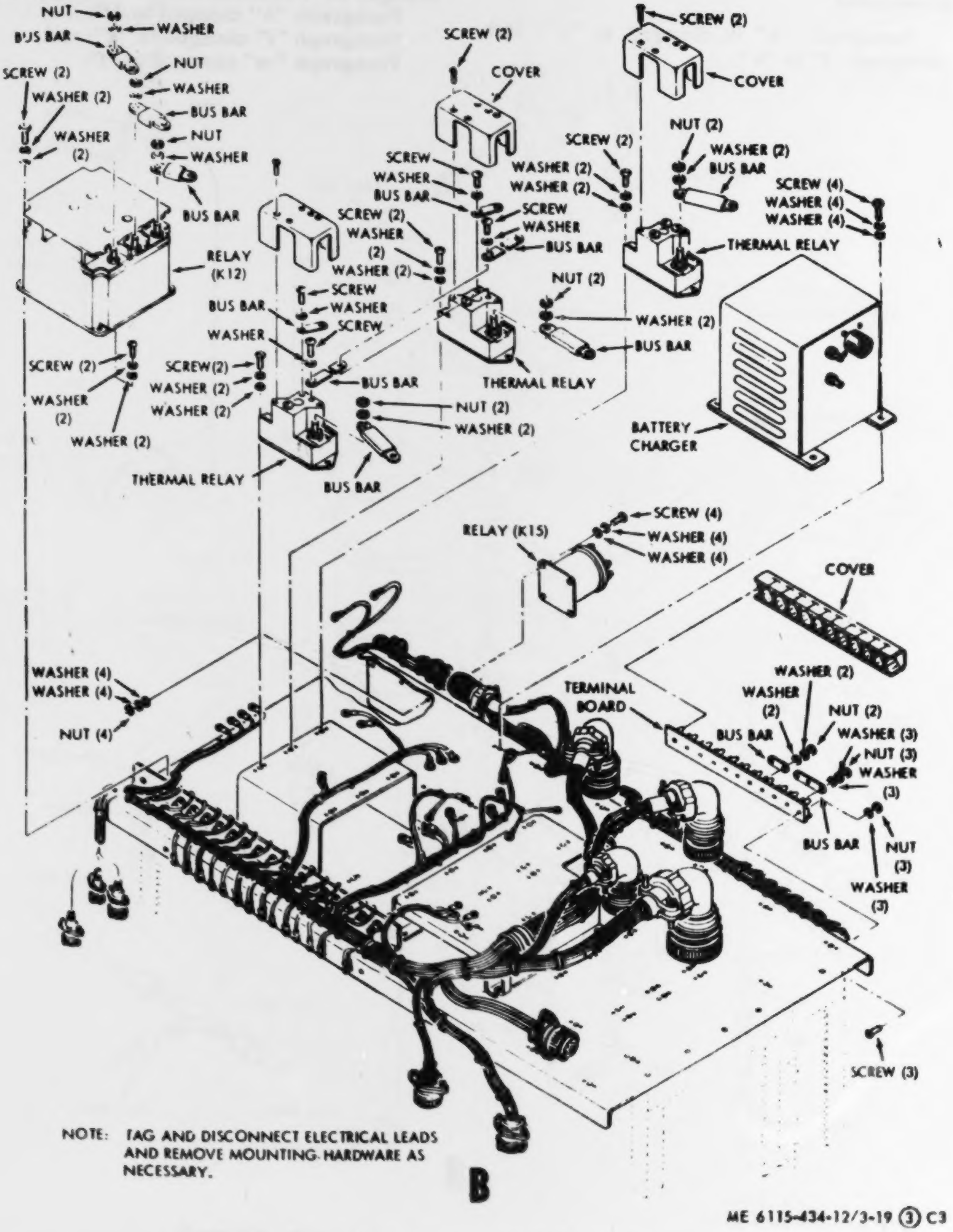
Figure 2-30. Operation to deliver hot and cold water (sheet 2 of 2).

Page 3-13. **Table 3-3, Malfunction Column, paragraph 17, the Probable Cause and Correction Action subparagraphs "e" and "h" are rescinded and subparagraphs "f" are changed to "e", "g" to "f", and "i" to "g".**

Page 3-31. **Paragraph 3-10*a*, in line 9, "jumper may be removed" is changed to "jumper must be removed".**

Page 3-32. **Paragraph 3-10*d* is rescinded, and paragraph "3-10*e*" is changed to "3-10*d*".**

Page 3-71. **Figure 3-19, sheet 3 of 3 is superseded.**


NUT
WASHER
BUS BAR
NUT
WASHER
BUS BAR
NUT
WASHER
BUS BAR
SCREW (2)
WASHER (2)
WASHER (2)
RELAY (K12)
SCREW (2)
WASHER (2)
WASHER (2)
SCREW (2)
COVER
SCREW
WASHER
BUS BAR
SCREW
WASHER
BUS BAR
SCREW (2)
WASHER (2)
WASHER (2)
SCREW
WASHER
BUS BAR
SCREW
WASHER
SCREW(2)
WASHER (2)
WASHER (2)
BUS BAR
NUT (2)
WASHER (2)
BUS BAR
THERMAL RELAY
THERMAL RELAY
SCREW (2)
WASHER (2)
WASHER (2)
NUT (2)
WASHER (2)
BUS BAR
SCREW (2)
COVER
NUT (2)
WASHER (2)
BUS BAR
SCREW (4)
WASHER (4)
WASHER (4)
THERMAL RELAY
BATTERY CHARGER
RELAY (K15)
SCREW (4)
WASHER (4)
WASHER (4)
COVER
WASHER (4)
WASHER (4)
NUT (4)
TERMINAL BOARD
WASHER (2)
WASHER (2)
NUT (2)
BUS BAR
WASHER (3)
NUT (3)
WASHER (3)
BUS BAR
NUT (3)
WASHER (3)
SCREW (3)
B
ME 6115-434-12/3-19 ③ C3

NOTE: TAG AND DISCONNECT ELECTRICAL LEADS AND REMOVE MOUNTING HARDWARE AS NECESSARY.

Figure 3-19. Upper rack assembly component replacement. (Sheet 3 of 3).

Page 3-72. Paragraph "*g* Relay (K13)" is rescinded.

Paragraph "*h*" is changed to "*g*", and paragraph "*i*" to "*h*".

Page 3-73. Paragraph "*j* Transformer" is changed to "*i* Transformer";
Paragraph "*k*" changed to "*j*";
Paragraph "*l*" changed to "*k*"; and
Paragraph "*m*" changed to "*l*".

Page 3-93. **Figure 3-26, sheet 2 of 3, is superseded.**

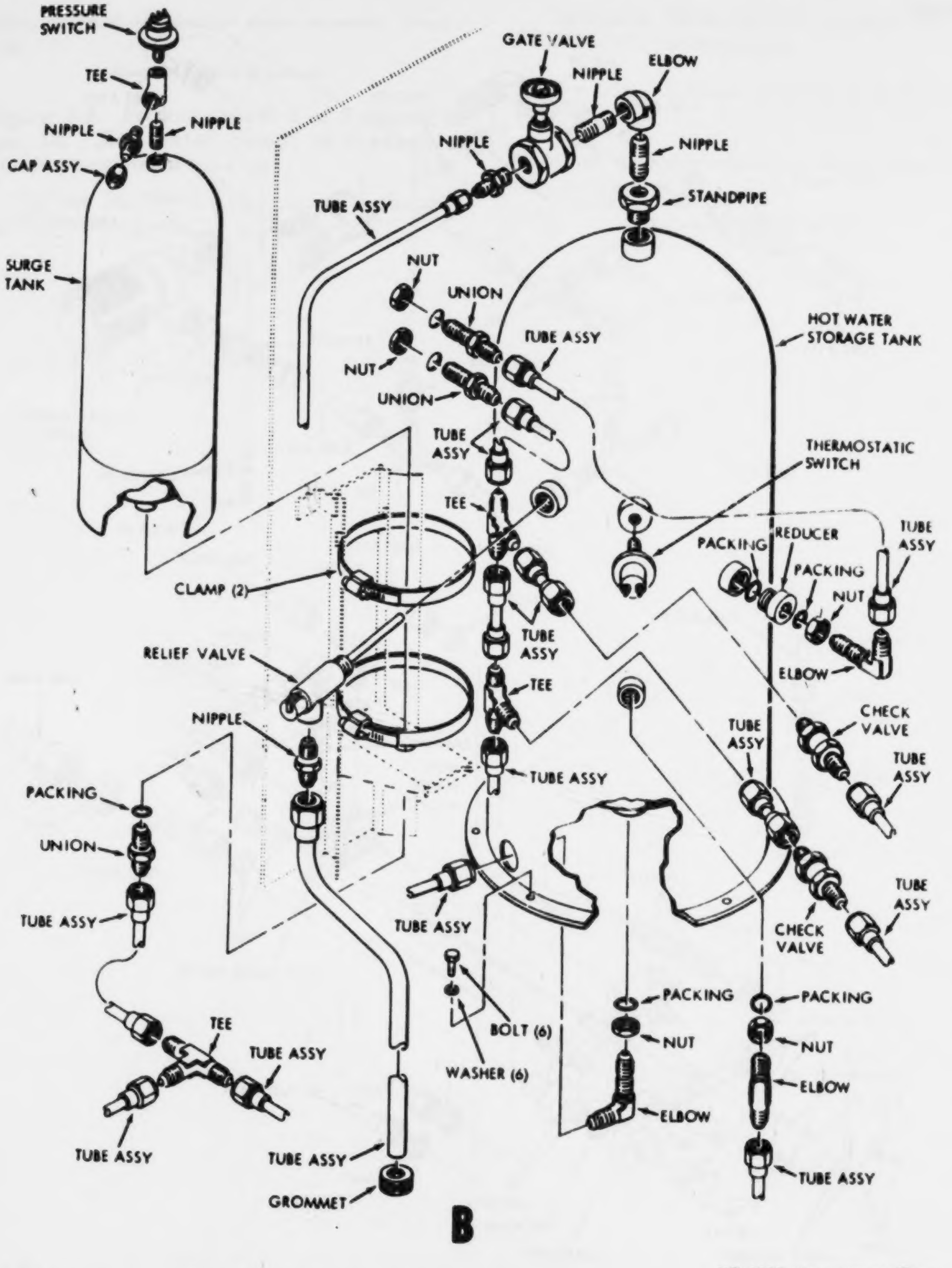
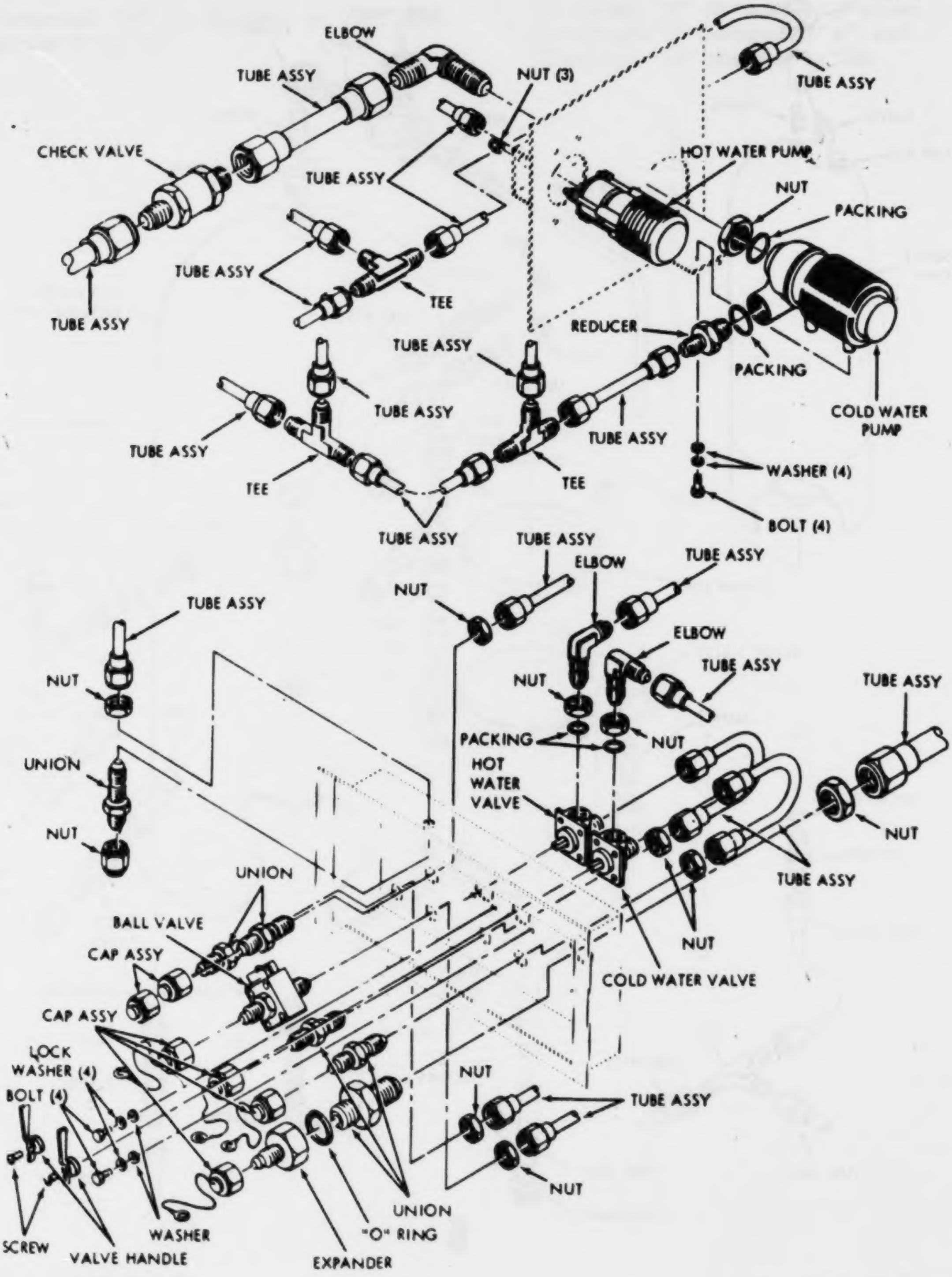

PRESSURE SWITCH
TEE
NIPPLE
NIPPLE
CAP ASSY
SURGE TANK
GATE VALVE
NIPPLE
ELBOW
NIPPLE
NIPPLE
TUBE ASSY
STANDPIPE
NUT
UNION
NUT
UNION
TUBE ASSY
HOT WATER STORAGE TANK
TUBE ASSY
THERMOSTATIC SWITCH
TEE
PACKING
REDUCER
PACKING
TUBE ASSY
NUT
CLAMP (2)
TUBE ASSY
ELBOW
RELIEF VALVE
TEE
CHECK VALVE
NIPPLE
TUBE ASSY
TUBE ASSY
TUBE ASSY
PACKING
UNION
TUBE ASSY
TUBE ASSY
TUBE ASSY
CHECK VALVE
PACKING
PACKING
BOLT (6)
NUT
NUT
TEE
TUBE ASSY
WASHER (6)
ELBOW
ELBOW
TUBE ASSY
TUBE ASSY
TUBE ASSY
GROMMET
B
ME 6115-434-12/3-26 ② C3

Figure 3-26. Water system components replacement (Sheet 2 of 3).

Page 3-94. **Figure 2-26, sheet 3 of 3 is superseded.**


ELBOW
TUBE ASSY
NUT (3)
TUBE ASSY
CHECK VALVE
TUBE ASSY
HOT WATER PUMP
NUT
PACKING
TUBE ASSY
TEE
TUBE ASSY
REDUCER
TUBE ASSY
PACKING
TUBE ASSY
COLD WATER PUMP
TUBE ASSY
TUBE ASSY
TEE
TEE
WASHER (4)
BOLT (4)
TUBE ASSY
TUBE ASSY
ELBOW
TUBE ASSY
NUT
TUBE ASSY
ELBOW
NUT
TUBE ASSY
TUBE ASSY
NUT
PACKING
NUT
HOT WATER VALVE
UNION
NUT
NUT
TUBE ASSY
UNION
BALL VALVE
CAP ASSY
NUT
COLD WATER VALVE
CAP ASSY
LOCK WASHER (4)
BOLT (4)
NUT
TUBE ASSY
NUT
UNION
"O" RING
WASHER
SCREW
VALVE HANDLE
EXPANDER

ME 6115-434-12/3-26 ③ C3

Figure 3-26. Water system components replacement (Sheet 3 of 3).

Figure 1-8. Foldout, sheet 1 of 2, is superseded.

Figure 1-8. Power unit electrical system schematic (Sheet 1 of 2).

(Located in back of manual)

Figure 1-8. Foldout, sheet 2 of 2, legend in line 13, "Hot water pump" is changed to "Cold water pump".

In line 14, "Cold water pump" is changed to "Hot water pump".

In line 8, "K13 CONTACTOR (COLD WATER PUMP)" is rescinded, and

In line 9, "S13 SWITCH (COLD WATER PRESSURE)" is rescinded.

Figure 1-18. Foldout, sheet 2 of 2, is superseded.

Figure 1-18. Gas turbine engine power plant practical wiring diagram (sheet 2 of 2)

(Located in back of manual)

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

Distribution:

To be distributed in accordance with DA Form 12-25, Sec IV (qty rqr Block no. 749), Operator requirements for Generator Sets, Engine Driven: 100 kw, 60 Cycle.

Changes in force, C 1 and C 2

TM 5-6115-434-12
C 2

CHANGE }
No. 2 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *18 May 1970*

Operator and Organizational Maintenace Manual

POWER UNIT, UTILITY PACK; GAS TURBINE ENGINE DRIVEN (AIRESEARCH MODEL PPU-85-5) NON-WINTERIZED, FSN 6115-937-0929, (AIRESEARCH MODEL PPU-85-4) WINTERIZED, FSN 6115-134-0825

TM 5-6115-434-12, 13 December 1968, is changed as follows:

Page C-7, Functional group 5217, line 3, Solenoid Valves, Column I Repair. "F" is changed to "D".

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief o, Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

Distribution:

To be distributed in accordance with DA Form 12-25, (qty rqr block no. 749) Section IV, Operator's maintenance requirements for Generator Sets, Engine Driven, 100 KW, 60 Cycle.

TECHNICAL MANUAL
No. 5-6115-434-12

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *13 December 1968*

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL
POWER UNIT, UTILITY PACK, GAS TURBINE ENGINE DRIVEN
(AIRESEARCH MODEL PPU85-5) NON-WINTERIZED
FSN 6115-937-0929
(AIRESEARCH MODEL PPU85-4) WINTERIZED
FSN 6115-134-0825

			Paragraphs	Pages
CHAPTER	1.	INTRODUCTION		
Section	I.	General	1-1, 1-2	1-1
	II.	Description and data	1-3, 1-5	1-1—1-33
CHAPTER	2.	INSTALLATION AND OPERATING INSTRUCTIONS		
Section	I.	Service upon receipt of material	2-1—2-3	2-1—2-5
	II.	Movement to a new work site	2-4, 2-5	2-12—2-16
	III.	Controls and instruments	2-6—2-12	2-21—2-34
	IV.	Operation under usual conditions	2-13—2-16	2-34, 2-35
	V.	Operation under unusual conditions	2-17—2-25	2-34—2-56
	VI.	Operation of auxiliary material used in conjunction with the equipment	2-26, 2-27	2-56
CHAPTER	3.	OPERATOR AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS		
Section	I.	Operator and organizational maintenance repair parts, tools and equipment	3-1, 3-2	3-1
	II.	Lubrication	3-3, 3-4	3-1
	III.	Preventive maintenance checks and services	3-5, 3-6	3-2, 3-3
	IV.	Troubleshooting	3-7, 3-8	3-3—3-18
	V.	Field expedient repairs	3-9, 3-10	3-31
	VI.	Radio interference suppression	3-11—3-14	3-32
	VII.	Fuel system	3-15—3-27	3-32—3-43
	VIII.	Lubrication system	3-28—3-42	3-43—3-48
	IX.	Engine electrical system	3-42—3-52	3-50—3-54
	X.	Instrument and controls panel assemblies	3-53—3-58	3-54—3-65
	XI.	400 HZ and 60 HZ electrical systems	3-59—3-65	3-67—3-82
	XII.	Cooled air system	3-66—3-68	3-85, 3-86
	XIII.	Heated air system	3-69—3-74	3-86—3-91
	XIV.	Water system	3-75—3-77	3-91
	XV.	Compressed air and vacuum system	3-78, 3-79	3-95
	XVI.	Enclosure	3-80, 3-81	3-95
CHAPTER	4.	SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE		
Section	I.	Shipment and limited storage	4-1—4-4	4-1, 4-2
	II.	Demolition of material to prevent enemy use	4-5—4-9	4-9, 4-3
APPENDIX	A.	REFERENCES		A-1
	B.	BASIC ISSUES ITEMS LIST		B-1
	C.	MAINTENANCE ALLOCATION CHART		C-1
INDEX				I-1

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

a. These instructions are published for the use of the personnel to whom the power unit is issued. They provide instructions on the operation and organizational maintenance of the equipment. Also included are descriptions of main components and their functions in relationship to other components.

b. Appendix A contains a list of publications applicable to this manual. Appendix B contains a list of basic issue items authorized for operation and organizational maintenance of this equipment and a list of maintenance and operating supplies required for initial operation. Appendix C contains the maintenance allocation chart.

1-2. Forms and Records

a. DA Forms and procedures used for equipment maintenance will be only those prescribed by TM 38-750, Army Equipment Record System and Procedures.

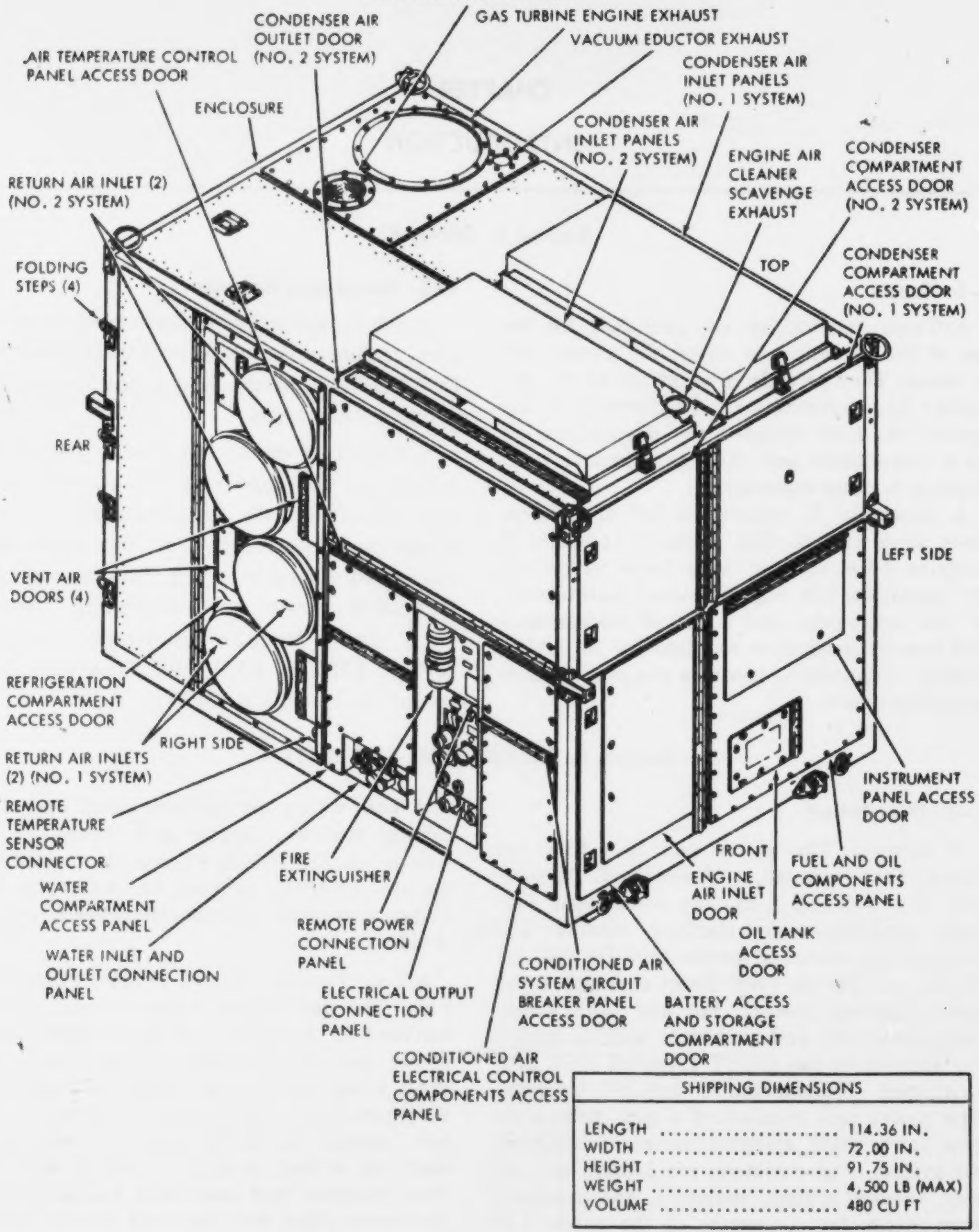
b. Report of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications) and forwarded direct to Commanding General, U. S. Army Mobility Equipment Command, ATTN: AMSME-MPP, 4300 Goodfellow Boulevard, St. Louis, Mo. 63120.

Section II. DESCRIPTION AND DATA

1-3. Description

a. General. The power unit is a fully enclosed, skid mounted, self-contained, portable unit (fig. 1-1 and 1-2). The power unit provides conditioned air (heating, cooling, and ventilation), electrical power (400 Hz (Hertz) 60 Hz, and 24v dc (volt direct current) emergency lighting power), hot and cold water, compressed air, and a vacuum suction system for support of the MUST (Medical Unit Self-Contained, Transportable) hospital elements. The power unit consists of a gas turbine engine power plant, electrical system, conditioned air system, water system, compressed air system, vacuum system, enclosure, and accessory components for connection of the power unit to other elements of the MUST hospital. The power unit requires only an external source of fuel and water for self-contained operation. Lifting, tiedown, support and connection provisions on the enclosure provide mobility of the unit by truck, railroad car, helicopter, airplane, mobilizing transporter wheels, and by skidding.

b. Gas Turbine Engine Power Plant (fig. 1-3). The gas turbine engine power plant is installed in the lower left front corner of the power unit and consists of a pneumatic and shaft power gas turbine engine, 60 Hz and 400 Hz generators, a fuel system, a lubrication system, various air ducts, plumbing installation, electrical wiring installation, and a skid base. Two electrical rack assemblies are installed on the power plant skid base and contain various regulating and control components for the power unit electrical system. The gas turbine


HEAT EXCHANGER EXHAUST
GAS TURBINE ENGINE EXHAUST
CONDENSER AIR OUTLET DOOR (NO. 2 SYSTEM)
VACUUM EDUCTOR EXHAUST
AIR TEMPERATURE CONTROL PANEL ACCESS DOOR
CONDENSER AIR INLET PANELS (NO. 1 SYSTEM)
ENCLOSURE
CONDENSER AIR INLET PANELS (NO. 2 SYSTEM)
ENGINE AIR CLEANER SCAVENGE EXHAUST
CONDENSER COMPARTMENT ACCESS DOOR (NO. 2 SYSTEM)
RETURN AIR INLET (2) (NO. 2 SYSTEM)
FOLDING STEPS (4)
TOP
CONDENSER COMPARTMENT ACCESS DOOR (NO. 1 SYSTEM)
REAR
LEFT SIDE
VENT AIR DOORS (4)
REFRIGERATION COMPARTMENT ACCESS DOOR
RIGHT SIDE
RETURN AIR INLETS (2) (NO. 1 SYSTEM)
INSTRUMENT PANEL ACCESS DOOR
REMOTE TEMPERATURE SENSOR CONNECTOR
FRONT
FUEL AND OIL COMPONENTS ACCESS PANEL
FIRE EXTINGUISHER
ENGINE AIR INLET DOOR
WATER COMPARTMENT ACCESS PANEL
OIL TANK ACCESS DOOR
REMOTE POWER CONNECTION PANEL
WATER INLET AND OUTLET CONNECTION PANEL
CONDITIONED AIR SYSTEM CIRCUIT BREAKER PANEL ACCESS DOOR
ELECTRICAL OUTPUT CONNECTION PANEL
BATTERY ACCESS AND STORAGE COMPARTMENT DOOR
CONDITIONED AIR ELECTRICAL CONTROL COMPONENTS ACCESS PANEL

SHIPPING DIMENSIONS	
LENGTH	114.36 IN.
WIDTH	72.00 IN.
HEIGHT	91.75 IN.
WEIGHT	4,500 LB (MAX)
VOLUME	480 CU FT

ME-5-6115-434-12/1-1

Figure 1-1. Power unit, right-front, three-quarter view with shipping dimensions.

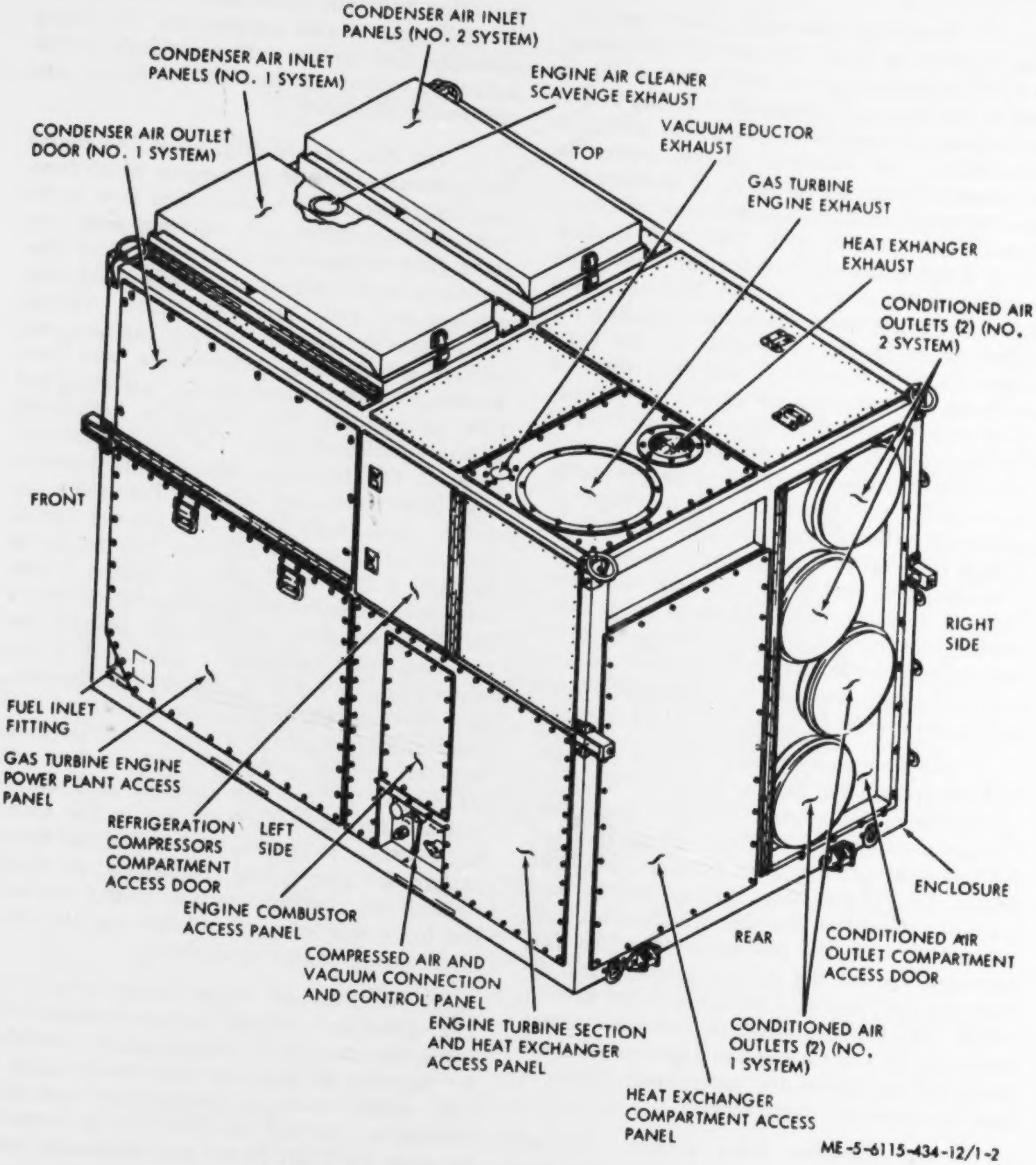

CONDENSER AIR INLET PANELS (NO. 2 SYSTEM)
CONDENSER AIR INLET PANELS (NO. 1 SYSTEM)
ENGINE AIR CLEANER SCAVENGE EXHAUST
CONDENSER AIR OUTLET DOOR (NO. 1 SYSTEM)
TOP
VACUUM EDUCTOR EXHAUST
GAS TURBINE ENGINE EXHAUST
HEAT EXHANGER EXHAUST
CONDITIONED AIR OUTLETS (2) (NO. 2 SYSTEM)
FRONT
RIGHT SIDE
FUEL INLET FITTING
GAS TURBINE ENGINE POWER PLANT ACCESS PANEL
REFRIGERATION COMPRESSORS COMPARTMENT ACCESS DOOR
LEFT SIDE
ENGINE COMBUSTOR ACCESS PANEL
ENCLOSURE
REAR
CONDITIONED AIR OUTLET COMPARTMENT ACCESS DOOR
COMPRESSED AIR AND VACUUM CONNECTION AND CONTROL PANEL
ENGINE TURBINE SECTION AND HEAT EXCHANGER ACCESS PANEL
CONDITIONED AIR OUTLETS (2) (NO. 1 SYSTEM)
HEAT EXCHANGER COMPARTMENT ACCESS PANEL
ME-5-6115-434-12/1-2

Figure 1–2. Power unit, left-rear, three-quarter view.

engine power plant provides shaft power to drive the 60 Hz and 400 Hz generators. Compressed air from the engine compressor section is used for external pneumatic power requirements, for heated air in the conditioned air system, water compartment heating air, vacuum system eductor air, and engine air cleaner ejector air. The engine exhaust heat is utilized through a heat exchanger to heat water for the water system.

(1) *Pneumatic and shaft power gas turbine engine (fig. 1-3)*. The gas turbine engine is a self-contained power source and requires only a fuel supply and electrical starting power to maintain a constant output power and rpm (revolutions per minute). Engine power is developed through compression of ambient air by a two-stage centrifugal compressor; the compressed air, mixed with fuel and ignited, drives a radial inward-flow turbine wheel. The rotating shaft power of the turbine wheel drives the compressor, the accessories, and the output drive shafts. A portion of the compressed air developed by the compressor is available for external pneumatic power applications. An internal system of pneumatic and electro-mechanical controls provide automatic and coordinated control of engine starts, acceleration, and operation. A minimum of additional external controls are required to initiate the engine starting cycle, monitor engine operation, and to stop engine operation. The gas turbine engine consists of a compressor and turbine section, accessory drive section, fuel control system, bleed-air control system, engine electrical system, and engine lubrication system.

(*a*) *Compressor and turbine section.* The compressor and turbine section is the power nucleus of the engine. The two stage centrifugal compressor develops compressed air for fuel combustion and for external pneumatic power. The single stage turbine incorporates a single combustion chamber which mixes compressed air with the fuel spray from the fuel atomizer, ignites the full-air mixture and directs the products of combustion to the turbine wheel. The turbine wheel converts the power developed in the combustion chamber to shaft power which drives the compressor impellers and the accessory drive section.

(*b*) *Accessory drive section.* The accessory drive section is a reduction gear system which reduces the high rotational speeds developed by the turbine wheel to a usable rpm to drive the engine accessory and a dual pad gear box for the 60 Hz and 400 Hz generators. In addition to mounting pads for the two generators, the accessory drive section provides mounting pads and drive gear connection for the following engine accessories: Oil pump assembly; fuel control unit; centrifugal switch assembly; cooling air fan; starter motor; and tachometer-generator.

(*c*) *Fuel system (fig. 1-4)*. The engine fuel system consists of components which function automatically to regulate fuel flow to the combustion chamber and maintain near constant governed speed and safe operating temperatures under varying conditions of starting, acceleration, and load application. Control components function by sensing engine speed, turbine exhaust gas temperature and compressor air pressure and react by adjusting fuel flow to maintain these reference indications within established limits. The fuel system consists of the following components together with interconnecting lines and fittings: a one gallon fuel tank for fuel reserve during changeover from one external fuel supply to another; a fuel boost pump to assure a constant inlet pressure to the fuel control unit; a fuel filter assembly to filter fuel between the fuel boost pump and fuel control unit; a fuel control unit to regulate fuel flow to the combustion chamber in response to engine rpm and load requirements; a fuel shutoff solenoid valve to provide electrically actuated on and off control of fuel flow between fuel control unit and fuel atomizer assembly; a fuel atomizer assembly to provide a controlled fuel spray pattern for proper fuel combustion; an acceleration and overtemperature control thermostat to prevent excessive exhaust gas temperatures during engine acceleration.

(*d*) *Bleed-air control system (fig. 1-4)*. The bleed-air control system automatically limits the amount of compressed air available for external applications thus maintaining a safe engine operating temperature and preventing an overload condition due to excessive demands for shaft power and pneumatic power. Automatic limiting of bleed-air is accomplished by a pneumatic thermostat installed in the turbine exhaust that opens at a preset exhaust gas temperature and bleeds control air from the load control valve thus causing the load control valve to modulate and reduce

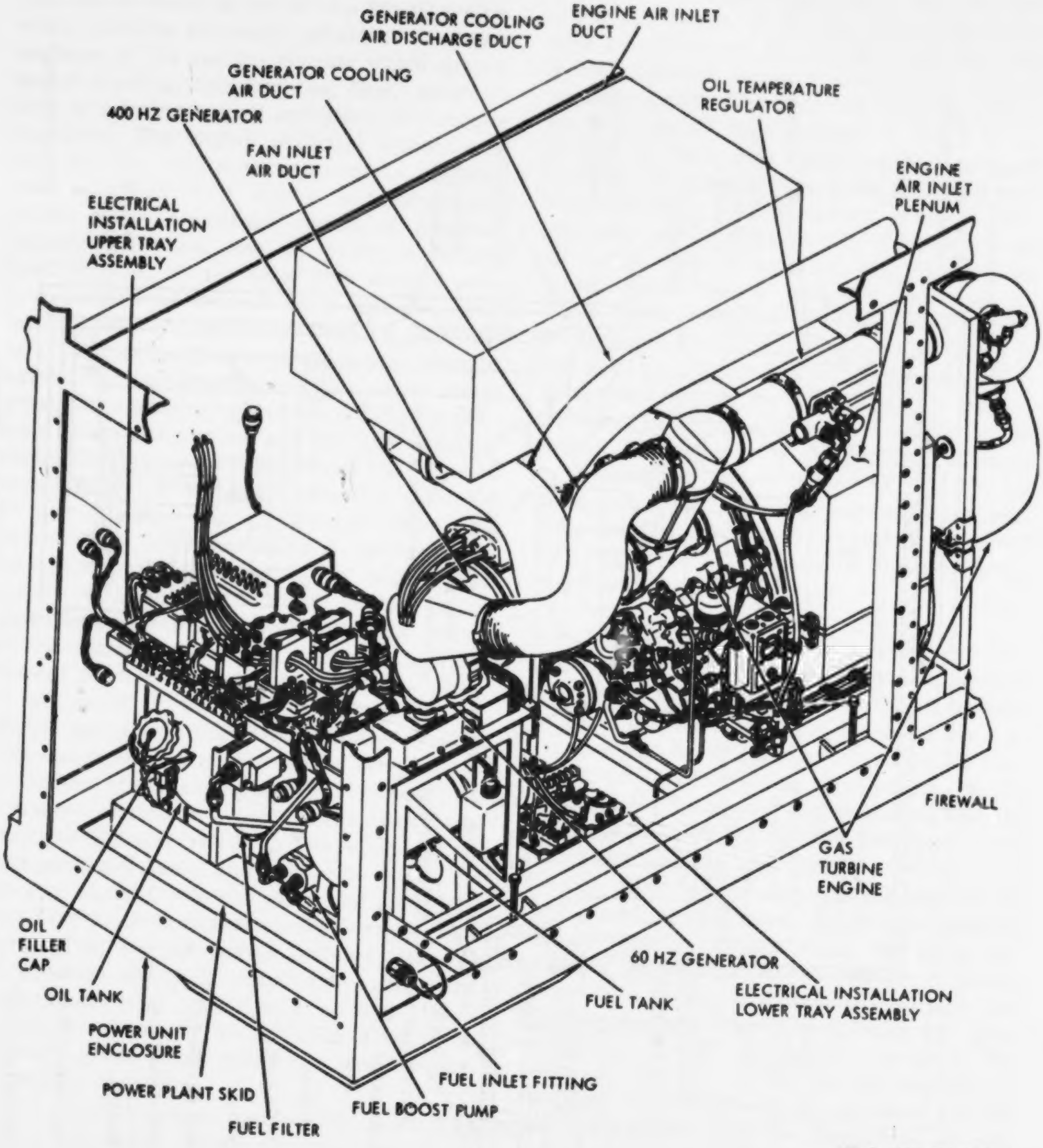

GENERATOR COOLING AIR DISCHARGE DUCT
ENGINE AIR INLET DUCT
GENERATOR COOLING AIR DUCT
OIL TEMPERATURE REGULATOR
400 HZ GENERATOR
FAN INLET AIR DUCT
ENGINE AIR INLET PLENUM
ELECTRICAL INSTALLATION UPPER TRAY ASSEMBLY
FIREWALL
GAS TURBINE ENGINE
OIL FILLER CAP
60 HZ GENERATOR
OIL TANK
FUEL TANK
ELECTRICAL INSTALLATION LOWER TRAY ASSEMBLY
POWER UNIT ENCLOSURE
POWER PLANT SKID
FUEL INLET FITTING
FUEL BOOST PUMP
FUEL FILTER
ME-5-6115-434-12/1-3

Figure 1-3. Gas turbine engine power plant.

the flow of compressed air from the engine. The bleed-air control system consists of the following components together with interconnecting lines and fittings: Load control valve; air pressure regulator; and load control thermostat.

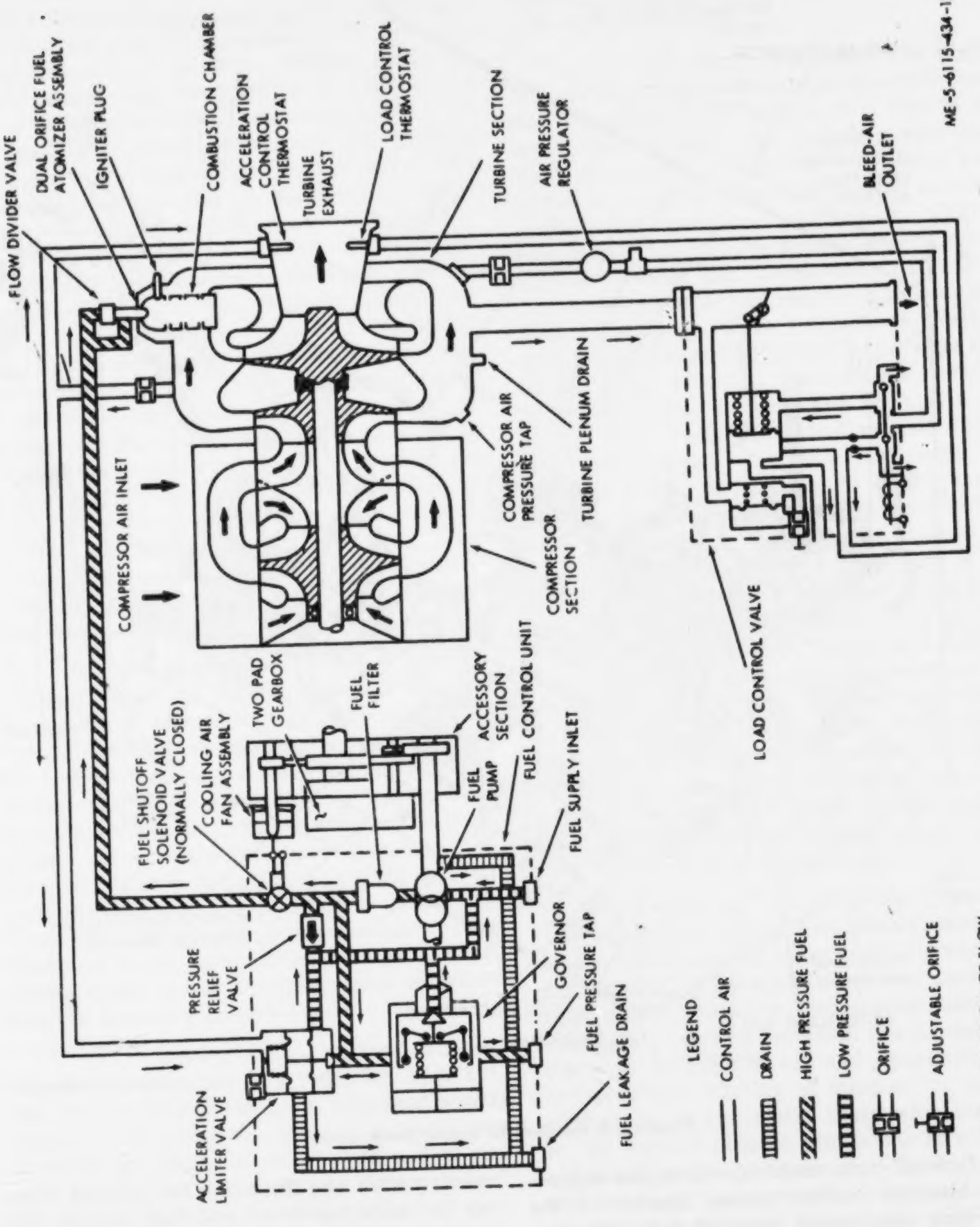

FLOW DIVIDER VALVE
DUAL ORIFICE FUEL ATOMIZER ASSEMBLY
IGNITER PLUG
COMBUSTION CHAMBER
ACCELERATION CONTROL THERMOSTAT
TURBINE EXHAUST
LOAD CONTROL THERMOSTAT
TURBINE SECTION
AIR PRESSURE REGULATOR
BLEED-AIR OUTLET
ME-5-6115-434-12/1-4
COMPRESSOR AIR INLET
COMPRESSOR AIR PRESSURE TAP
TURBINE PLENUM DRAIN
COMPRESSOR SECTION
LOAD CONTROL VALVE
FUEL SHUTOFF SOLENOID VALVE (NORMALLY CLOSED)
COOLING AIR FAN ASSEMBLY
TWO PAD GEARBOX
FUEL FILTER
FUEL PUMP
ACCESSORY SECTION
FUEL CONTROL UNIT
FUEL SUPPLY INLET
PRESSURE RELIEF VALVE
GOVERNOR
FUEL PRESSURE TAP
ACCELERATION LIMITER VALVE
FUEL LEAKAGE DRAIN
LEGEND
CONTROL AIR
DRAIN
HIGH PRESSURE FUEL
LOW PRESSURE FUEL
ORIFICE
ADJUSTABLE ORIFICE
DIRECTION OF FLOW

Figure 1-4. Engine fuel and bleed-air control system schematic.

(*e*) *Engine electrical system (fig. 1-5).* The engine electrical system is a 24v dc system which provides automatic actuation in proper sequence of the various circuits which control engine starting, ignition, fuel flow, acceleration, monitoring engine operation, and engine shutdown. The engine electrical system consists of the following components together with interconnecting wiring and connectors: starter motor, centrifugal switch, oil pressure sequencing switch, low oil pressure switch, ignition unit, igniter plug, fuel shutoff solenoid valve, load control valve solenoid, time totalizing meter, circuit breaker, oil temperature bulb, exhaust gas temperature thermocouple, and tachometer-generator. When energized, the starter motor rotates the engine gear train and compressor and turbine rotating parts. Rising oil pressure actuates the oil pressure sequencing switch to complete a circuit to open the fuel shutoff solenoid valve and energize the ignition unit and igniter plug. At approximately 35-percent of engine governed speed, the starter cutout switch in the centrifugal switch actuates to open the circuit to the starter motor. At approximately 95-percent of engine governed speed, the ready to load switch in the centrifugal switch is actuated and opens the circuit to the ignition unit and closes the circuit of the time totalizing meter. If the engine should overspeed, the overspeed shutdown switch in the centrifugal switch is actuated at 105 to 110-percent of engine governed speed and opens the circuit to the fuel shutoff solenoid valve and stops the fuel flow to the combustion chamber to stop the engine. During engine starting, the low oil pressure switch is actuated by increasing oil pressure and completes a holding circuit which is opened to shutoff fuel flow if oil pressure drops below minimum pressure during engine operation.

(*f*) *Lubrication system (fig. 1-6).* The engine lubrication system provides pressurized spray and splash lubrication for the gears, shafts, and bearings in the engine. The lubrication system consists of the following components together with interconnecting lines and fittings; an oil pump assembly with integral pressure and scavenge pumps and a filter element, oil temperature bulb, oil jet and scavenge fittings, cooling air fan, oil temperature regulator (oil cooler) oil tank, dual pad drive assembly scavenge pump, and low oil pressure switch. The oil pump assembly pumps oil from the oil tank through a filter to the oil jets on the engine. Scavenge oil is pumped from the engine scavenge areas to the oil temperature regulator (oil cooler), where a thermostatic valve bypasses the oil through the oil cooler tubes, if required, then returns the cooled oil to the oil tank. The scavenge oil pump on the dual pad drive assembly returns scavenge oil from the drive assembly sump to the oil tank. The cooling air fan directs a portion of the cooling air flow through a duct to the tubes in the oil temperature regulator (oil cooler). The remaining cooling air developed by the cooling fan is ducted to the 400 Hz generator. The low oil pressure switch provides for shutdown of the engine in the event oil pressure should drop below minimum pressure during engine operation.

c. Power Unit Electrical System (fig. 1-7 and 1-8). The power unit electrical system consists of a 24v dc system powered by batteries, a 120/240v ac single phase, 60 Hz system powered by the engine driven 60 Hz generator, and a 120/208v ac three phase, 400 Hz system powered by the engine driven 400 Hz generator. The 24v dc system provides power for engine starting and control, control power for the other power unit systems (electrical, conditioned air and water) control components, and emergency lighting power for other elements of the MUST hospital. The 24v dc emergency light power is distributed through the 60 Hz system convenience receptacles and cable assemblies. The 60 Hz system provides 60 Hz power to elements of the MUST hospital as required. The 400 Hz system provides 400 Hz power for operation of the conditioned air system, water pumps, water hose heating, battery charging, and for 400 Hz power requirements for other elements of the MUST hospital. All of the electrical systems incorporate safety devices to disconnect the electrical output and prevent damage to components in the event of an overload, undervoltage, overvoltage, or

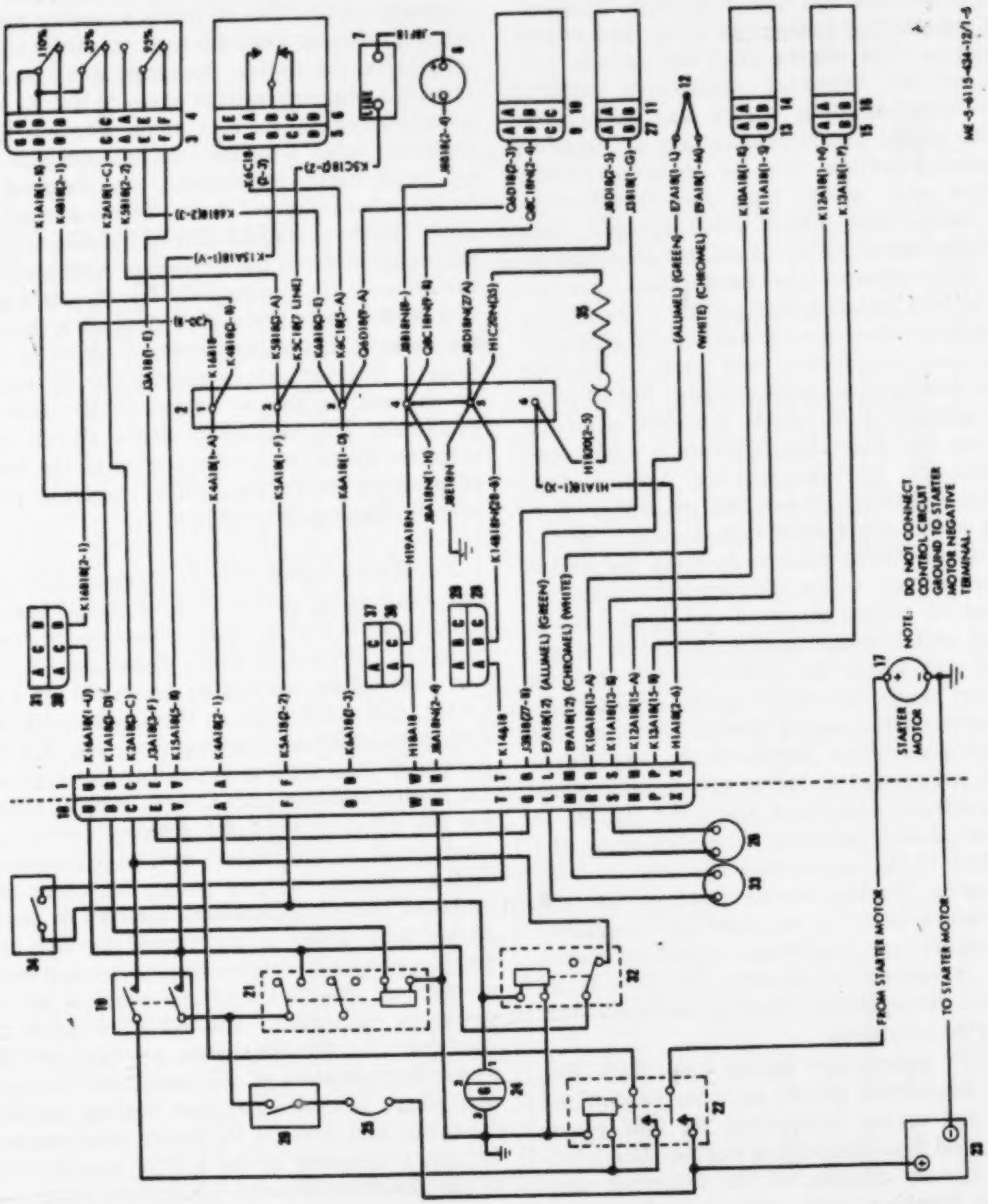

STARTER MOTOR
NOTE: DO NOT CONNECT CONTROL CIRCUIT GROUND TO STARTER MOTOR NEGATIVE TERMINAL.
FROM STARTER MOTOR
TO STARTER MOTOR
ME-5-6115-434-12/1-5

Figure 1-5. Engine electrical system schematic.

1 Connector
2 Terminal board
3 Connector
4 Centrifugal multi-speed switch
5 Connector
6 Oil pressure sequencing switch
7 Circuit breaker
8 Time totalizing meter
9 Connector
10 Fuel solenoid
11 Ignition unit
12 Thermocouple, exhaust gas temperature
13 Connector
14 Generator tachometer (used for engine testing only)
15 Connector
16 Oil temperature bulb
17 Starter motor
18 Connector
19 Start switch
20 Master switch
21 Turbine holding relay
22 Start relay
23 Power source—24 volt DC
24 Ready to load light
25 Circuit breaker
26 Tachometer indicator (connected for engine testing only)
27 Connector
28 Connector
29 Load control valve
30 Connector
31 Low oil pressure switch
32 Under frequency arming relay
33 Exhaust gas temperature indicator
34 Bleed air switch
35 Heater assembly fuel line
36 Connector
37 Flow control valve (hot water)

Figure 1-5—Continued.

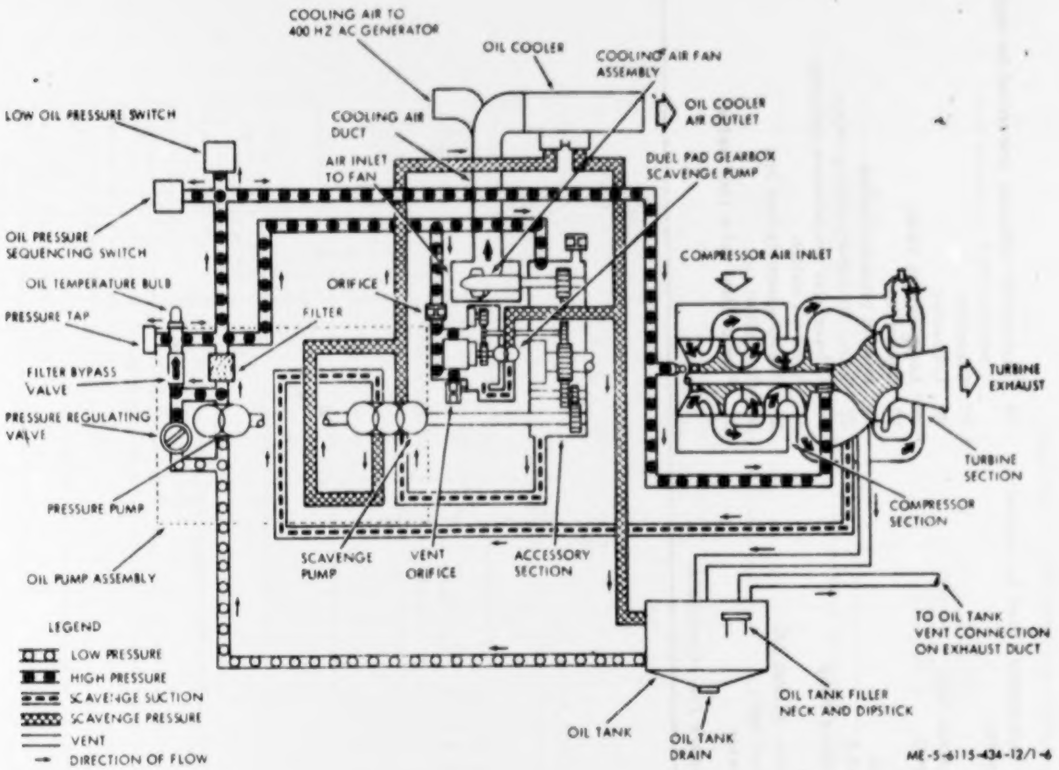

COOLING AIR TO 400 HZ AC GENERATOR
OIL COOLER
COOLING AIR FAN ASSEMBLY
OIL COOLER AIR OUTLET
LOW OIL PRESSURE SWITCH
COOLING AIR DUCT
AIR INLET TO FAN
DUEL PAD GEARBOX SCAVENGE PUMP
OIL PRESSURE SEQUENCING SWITCH
COMPRESSOR AIR INLET
OIL TEMPERATURE BULB
ORIFICE
PRESSURE TAP
FILTER
TURBINE EXHAUST
FILTER BYPASS VALVE
PRESSURE REGULATING VALVE
TURBINE SECTION
PRESSURE PUMP
COMPRESSOR SECTION
SCAVENGE PUMP
VENT ORIFICE
ACCESSORY SECTION
OIL PUMP ASSEMBLY
TO OIL TANK VENT CONNECTION ON EXHAUST DUCT
LEGEND
LOW PRESSURE
HIGH PRESSURE
SCAVENGE SUCTION
SCAVENGE PRESSURE
VENT
DIRECTION OF FLOW
OIL TANK FILLER NECK AND DIPSTICK
OIL TANK
OIL TANK DRAIN
ME-5-6115-434-12/1-6

Figure 1-6. Engine lubrication system schematic.

underfrequency condition (except 60 Hz system). The power unit includes electrical circuits for connection as a standby unit and will automatically start and deliver power should the operating power unit shut down. The 24v dc system also includes circuits and cable assemblies for connection of an external source of 24v dc power for starting. The power unit may also be connected to another power unit to provide 24v dc and 400 Hz power to the nonoperating power unit for operation of the ventilating fans in the nonoperating unit, provided the cooled air system in the operating unit is not operating.

(1) *24v dc electrical system (fig. 1-7 and 1-8)*. The 24v dc system provides power for engine starting and for the switches, relays, contactors, solenoids, etc, which control operation of the engine electrical system, 60 Hz and 400 Hz electrical systems, conditioned air system, and water system. The batteries which provide the dc power will also provide up to one hour of emergency light service to other elements of the MUST hospital in the event of engine or electrical system failure. The batteries are recharged through a transformer-rectifier type battery charger powered from the 400 Hz electrical system. Provisions are also incorporated in the 24v dc system to connect an external source of 24v dc power for engine starting in the event the batteries are discharged.

(2) *60 Hz electrical system (fig. 1-7 and 1-8)*. The 60 Hz electrical system provides 120/240v ac, 60 Hz, single phase output power for external requirements. The system consists of a brushless, self-excited, air-cooled generator, a voltage regulator, a generator protective panel, output power convenience recep-

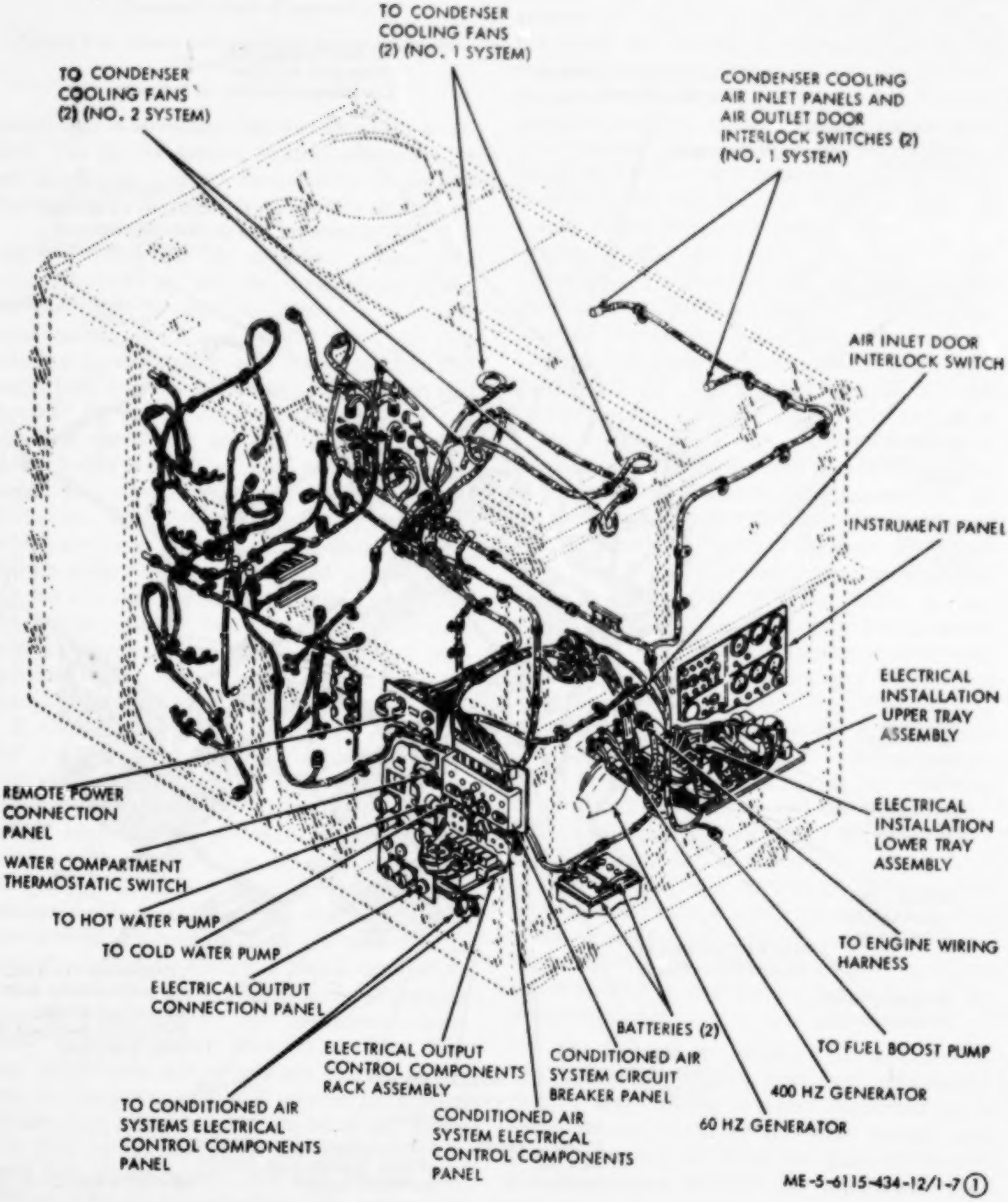

TO CONDENSER COOLING FANS (2) (NO. 1 SYSTEM)
TO CONDENSER COOLING FANS (2) (NO. 2 SYSTEM)
CONDENSER COOLING AIR INLET PANELS AND AIR OUTLET DOOR INTERLOCK SWITCHES (2) (NO. 1 SYSTEM)
AIR INLET DOOR INTERLOCK SWITCH
INSTRUMENT PANEL
ELECTRICAL INSTALLATION UPPER TRAY ASSEMBLY
ELECTRICAL INSTALLATION LOWER TRAY ASSEMBLY
REMOTE POWER CONNECTION PANEL
WATER COMPARTMENT THERMOSTATIC SWITCH
TO HOT WATER PUMP
TO COLD WATER PUMP
ELECTRICAL OUTPUT CONNECTION PANEL
TO ENGINE WIRING HARNESS
BATTERIES (2)
TO FUEL BOOST PUMP
ELECTRICAL OUTPUT CONTROL COMPONENTS RACK ASSEMBLY
CONDITIONED AIR SYSTEM CIRCUIT BREAKER PANEL
400 HZ GENERATOR
TO CONDITIONED AIR SYSTEMS ELECTRICAL CONTROL COMPONENTS PANEL
CONDITIONED AIR SYSTEM ELECTRICAL CONTROL COMPONENTS PANEL
60 HZ GENERATOR
ME-5-6115-434-12/1-7 ①

Figure 1-7. Power unit electrical system (Sheet 1 of 2).

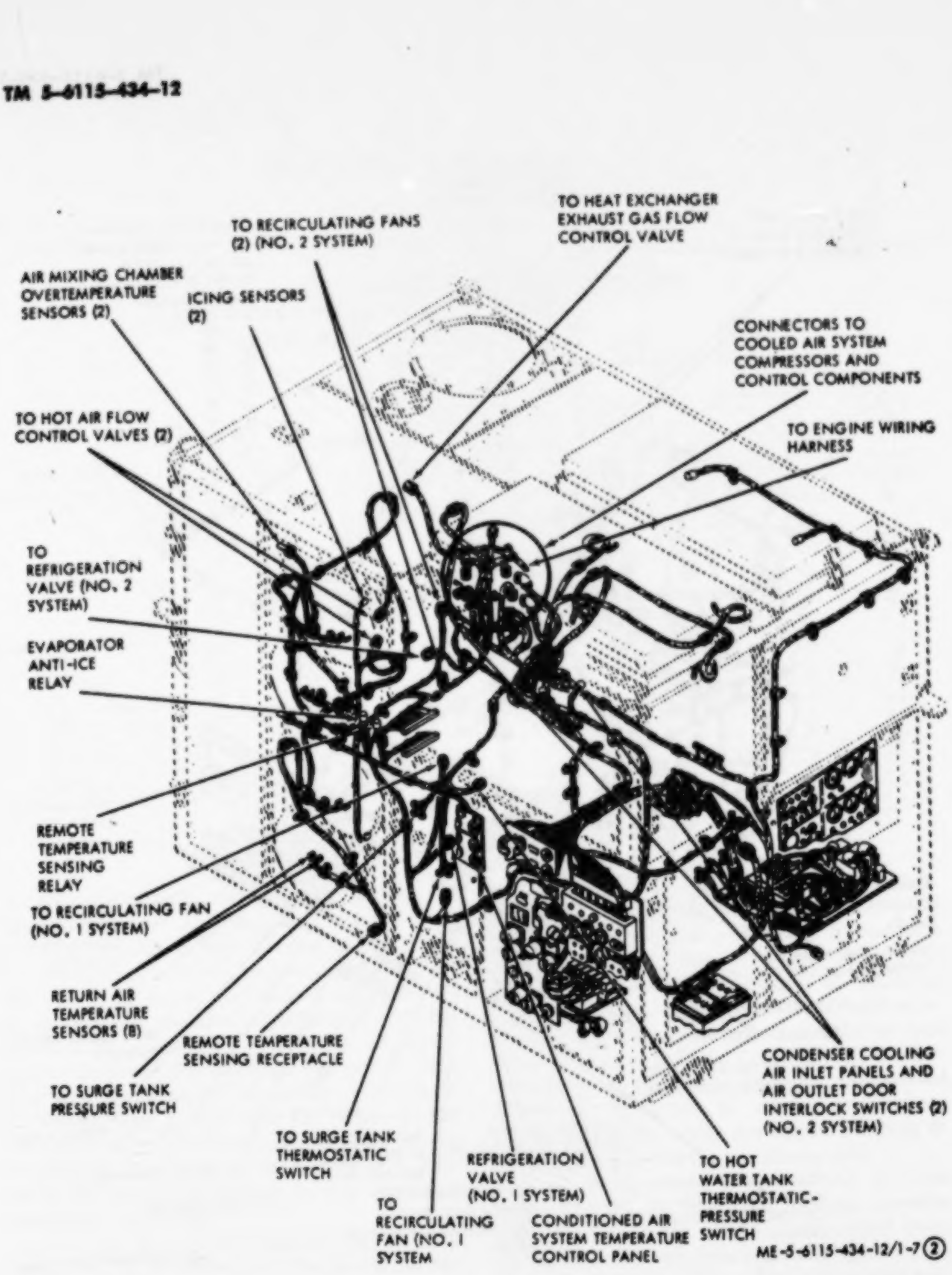

TO HEAT EXCHANGER EXHAUST GAS FLOW CONTROL VALVE
TO RECIRCULATING FANS (2) (NO. 2 SYSTEM)
AIR MIXING CHAMBER OVERTEMPERATURE SENSORS (2)
ICING SENSORS (2)
CONNECTORS TO COOLED AIR SYSTEM COMPRESSORS AND CONTROL COMPONENTS
TO ENGINE WIRING HARNESS
TO HOT AIR FLOW CONTROL VALVES (2)
TO REFRIGERATION VALVE (NO. 2 SYSTEM)
EVAPORATOR ANTI-ICE RELAY
REMOTE TEMPERATURE SENSING RELAY
TO RECIRCULATING FAN (NO. 1 SYSTEM)
RETURN AIR TEMPERATURE SENSORS (8)
REMOTE TEMPERATURE SENSING RECEPTACLE
TO SURGE TANK PRESSURE SWITCH
TO SURGE TANK THERMOSTATIC SWITCH
TO RECIRCULATING FAN (NO. 1 SYSTEM
REFRIGERATION VALVE (NO. 1 SYSTEM)
CONDITIONED AIR SYSTEM TEMPERATURE CONTROL PANEL
TO HOT WATER TANK THERMOSTATIC-PRESSURE SWITCH
CONDENSER COOLING AIR INLET PANELS AND AIR OUTLET DOOR INTERLOCK SWITCHES (2) (NO. 2 SYSTEM)
ME-5-6115-434-12/1-7 ②

Figure 1-7. Power unit electrical system (Sheet 2 of 2).

Figure 1-8. Power unit electrical system schematic (Sheet 1 of 2).

(Located in back of manual)

Figure 1-8. Power unit electrical system schematic (Sheet 2 of 2).

(Located in back of manual)

tacles, and interconnecting wiring and connectors. The 60 Hz system neutral conductor is not grounded. Control components in the 60 Hz system are powered from the 24v dc system.

(3) *400 Hz electrical system (fig. 1-7 and 1-8).* The 400 Hz electrical system provides 120/208v ac, 400 Hz, three phase power for operation of the conditioned air system compressors, condenser cooling fans, air circulating fans, hot and cold water pumps, and water hose heaters, 24v dc battery charger, and for 400 Hz power requirements in other elements of the MUST hospital. The 400 Hz system consists of a brushless, self-excited, air-cooled generator, voltage regulator, generator protective panel, output power receptacles, and interconnecting wiring and connectors. The 400 Hz generator incorporates an integral cooling fan and receives additional cooling air from the engine cooling fan. The 400 Hz system neutral conductor is grounded. Control components in the 400 Hz system are powered from the 24v dc system.

d. Conditioned Air System (fig. 1-9, 1-10, and 1-11). The conditioned air system supplies cooled air, heated air, or ventilating air under slight pressure to other elements of the MUST hospital. The system is a recirculating system with recirculating fans in the return air plenum. Adjustable vents in the return air compartments permit adding make-up air to the system. The conditioned air system consists of a cooled air system, a heated air system, and a ventilating air system. The three systems function independently but use some components interchangeably between systems. The four conditioned air outlets are located at the rear of the power unit and provide connection flanges for attaching the distribution ducts. The four return air inlets are located on the right side of the power unit and provide connection flanges for attaching the return air ducts. Covers are provided for the outlets and inlets when not in use. The four return air inlets are provided with permanent high-velocity-type cleanable air filters. Two temperature sensors are located at each of the four return air inlets to provide temperature control of the output air in response to temperature changes in the return air. Also, a remote temperature sensor may be connected to an electrical connector provided on the return air inlet panel to provide temperature sensing and control in MUST hospital elements that do not utilize the return air ducts.

(1) *Cooled air system (fig. 1-9, 1-10).* The cooled air system uses two independent 10 ton (refrigerating capacity) refrigeration systems for maximum flexibility of operation. The two refrigeration systems may be operated individually or together to provide 20 tons cooling capacity. Each refrigeration system is a vapor cycle closed loop system consisting of an electric-motor-driven refrigerant compressor with an integral overtemperature switch, an air-cooled refrigerant condenser, two condenser cooling fans, a refrigerant receiver, an expansion valve, an evaporator, two recirculating fans, a refrigeration solenoid valve, a compressor bypass solenoid valve, an overpressure switch, a refrigeration de-icing system, and associated tubing, fittings, and refrigerant level sight gages. All electric motors in the refrigeration system are powered by the 400 Hz electrical system and all control components are powered by the 24v dc electrical system. Output temperature control of the refrigeration systems is automatic with variable adjustment provided. Refrigeration output temperature control is accomplished by three solenoid-operated valves, a refrigerant flow control valve, a compressor bypass valve, and a de-icing valve. The de-icing system functions automatically to prevent ice formation on the evaporator core.

(2) *Heated air system (fig. 1-9, 1-11).* The heated air system uses two independent control and mixing systems connected to a single source of heated air. Each system uses hot compressed air from the gas turbine engine compressor through the engine load control valve. The heated compressed air passes through one or both thermostatically controlled, electrically actuated flow control

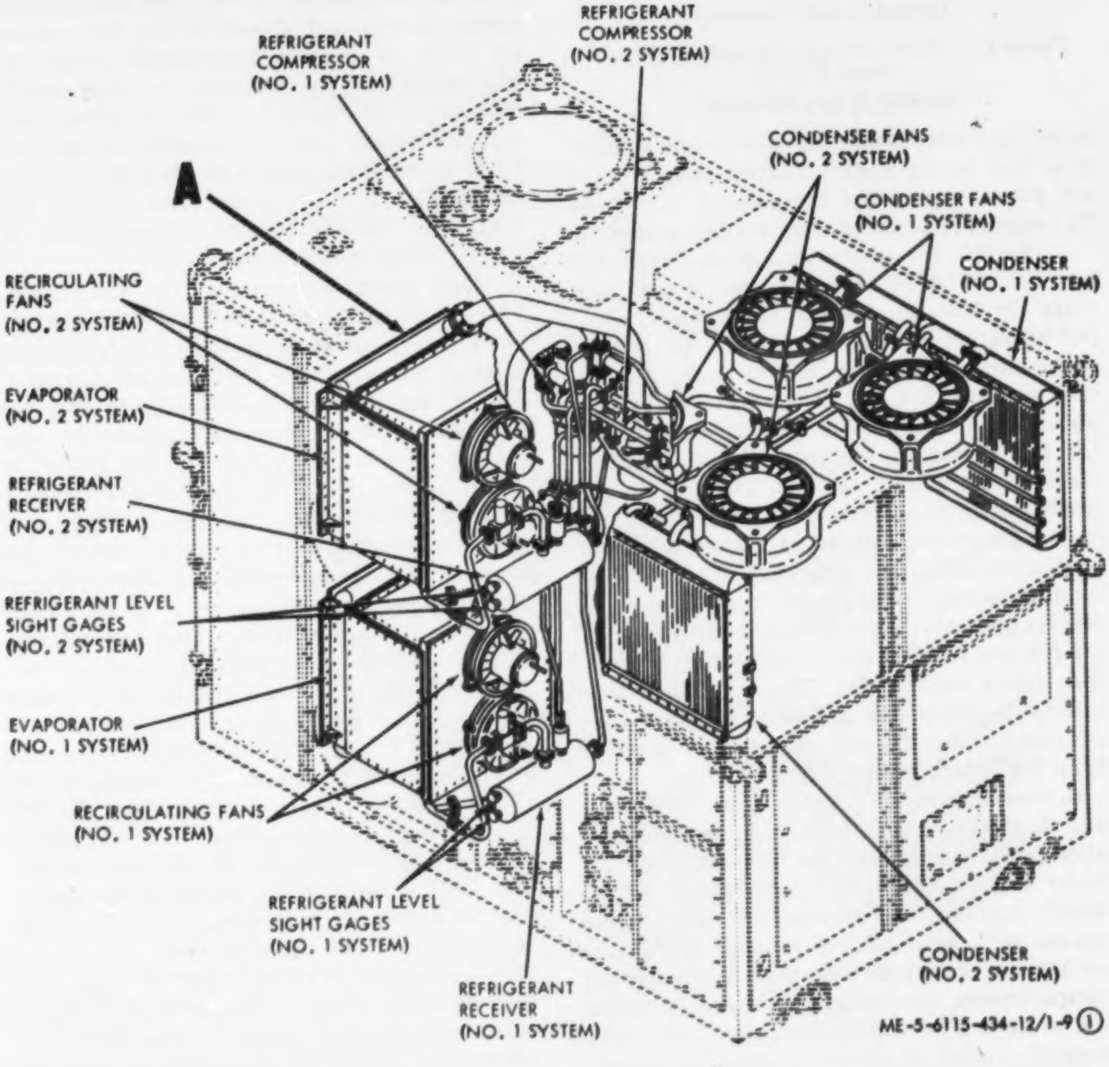

REFRIGERANT COMPRESSOR (NO. 1 SYSTEM)
REFRIGERANT COMPRESSOR (NO. 2 SYSTEM)
CONDENSER FANS (NO. 2 SYSTEM)
CONDENSER FANS (NO. 1 SYSTEM)
CONDENSER (NO. 1 SYSTEM)
A
RECIRCULATING FANS (NO. 2 SYSTEM)
EVAPORATOR (NO. 2 SYSTEM)
REFRIGERANT RECEIVER (NO. 2 SYSTEM)
REFRIGERANT LEVEL SIGHT GAGES (NO. 2 SYSTEM)
EVAPORATOR (NO. 1 SYSTEM)
RECIRCULATING FANS (NO. 1 SYSTEM)
REFRIGERANT LEVEL SIGHT GAGES (NO. 1 SYSTEM)
REFRIGERANT RECEIVER (NO. 1 SYSTEM)
CONDENSER (NO. 2 SYSTEM)
ME-5-6115-434-12/1-9 ①

Figure 1-9. Conditioned air system (Sheet 1 of 2).

valves into the mixing chambers. The heated air is mixed with recirculating air from the recirculating fans and is distributed through the air outlet ducts to the elements of the MUST hospital. Output temperature control of the heated air system is automatic with variable adjustment provided. The temperature sensors, installed in the return air inlets, or a remote temperature sensor, provide automatic temperature control of the output air to the selected temperature by opening and closing the flow control valves to increase or decrease the flow of heated compressed air to the mixing chambers. Overtemperature thermoswitches installed in the mixing chambers, will actuate to close the engine load control valve in the event heated air temperatures exceed safe maximum.

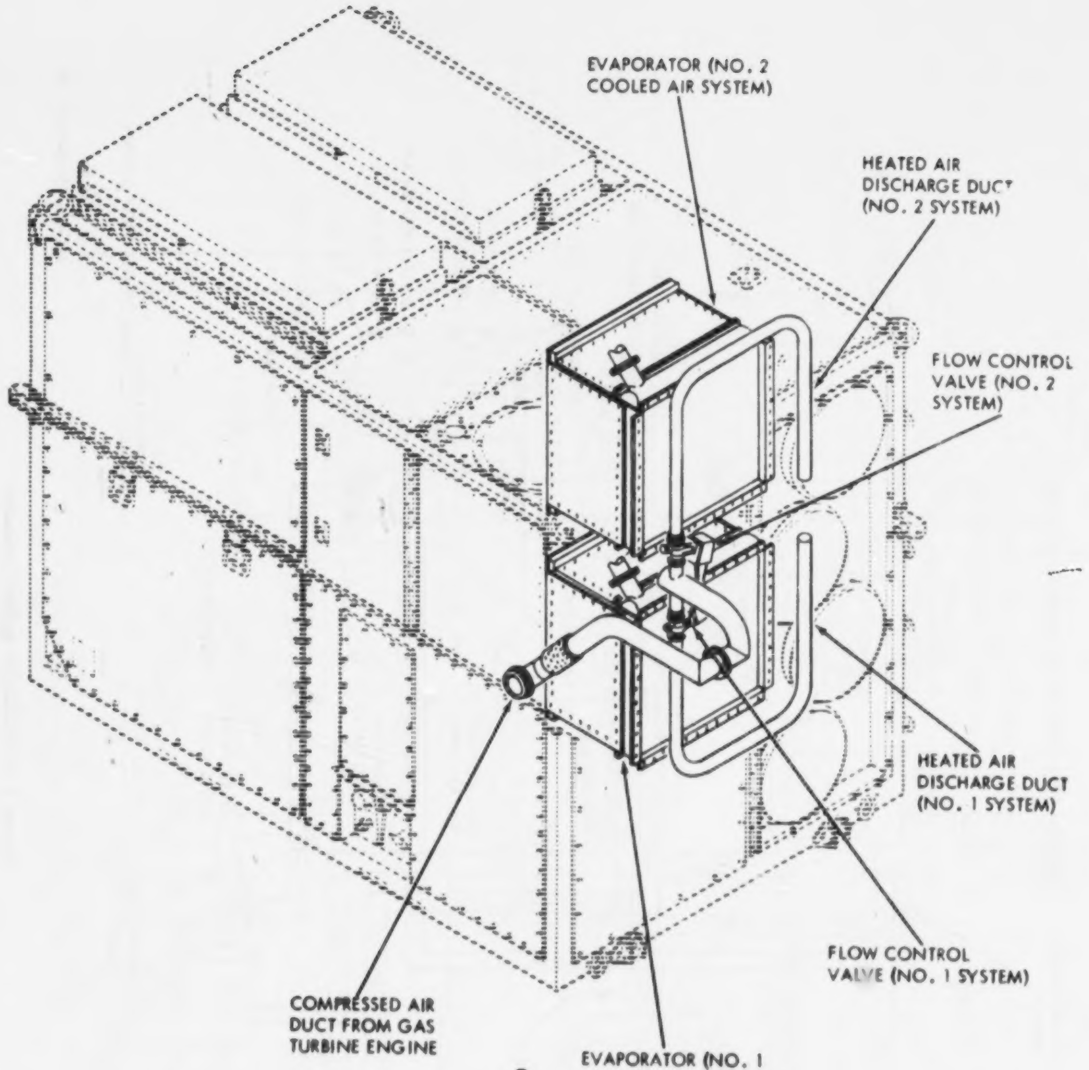
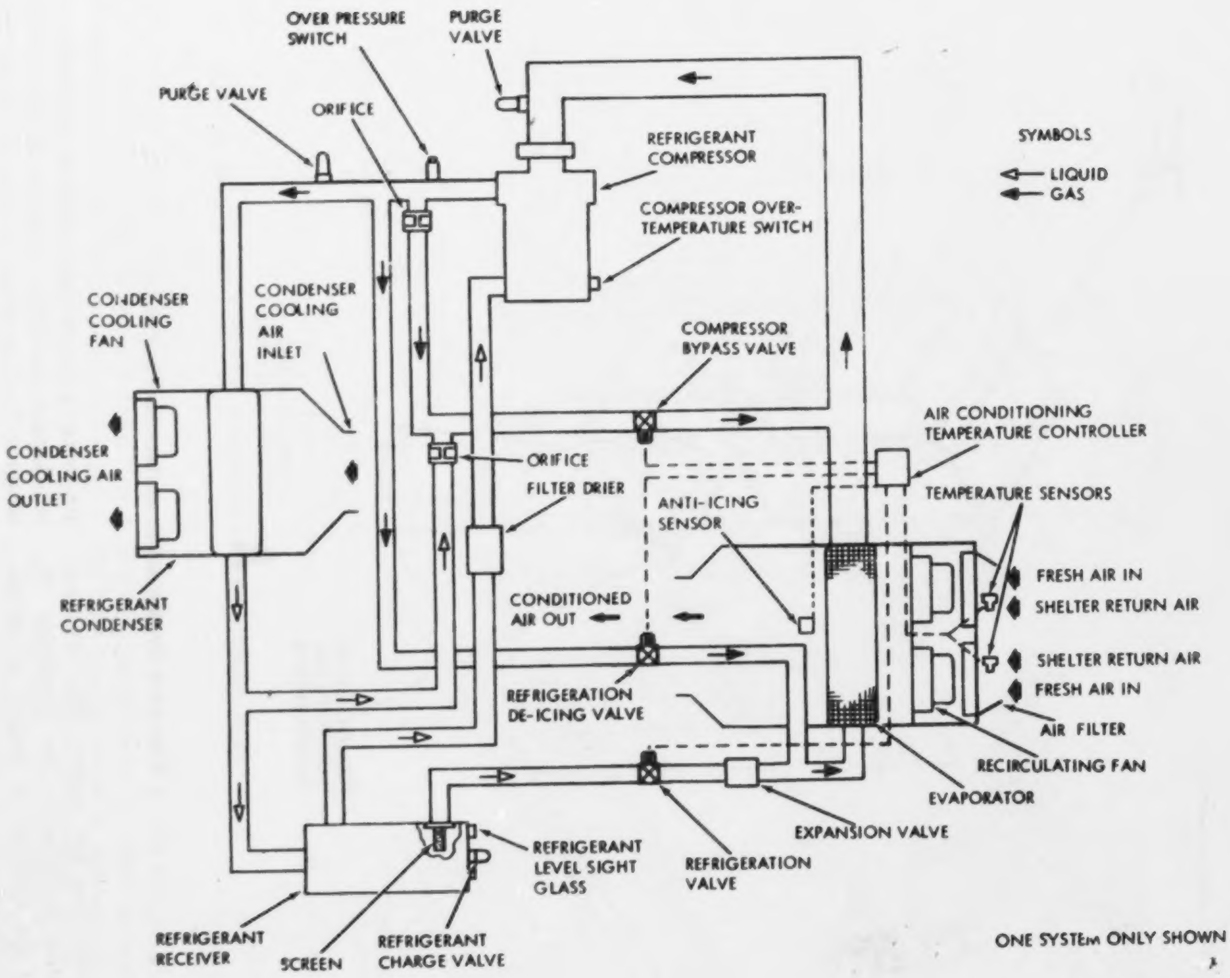

EVAPORATOR (NO. 2 COOLED AIR SYSTEM)
HEATED AIR DISCHARGE DUCT (NO. 2 SYSTEM)
FLOW CONTROL VALVE (NO. 2 SYSTEM)
HEATED AIR DISCHARGE DUCT (NO. 1 SYSTEM)
FLOW CONTROL VALVE (NO. 1 SYSTEM)
COMPRESSED AIR DUCT FROM GAS TURBINE ENGINE
EVAPORATOR (NO. 1 COOLED AIR SYSTEM)
A
ME-5-6115-434-12/1-9 ②

Figure 1-9. Conditioned air system (Sheet 2 of 2).

(3) *Venilating air system.* The ventilating air system provides for the circulation of air without the addition of heated or cooled air. The system uses the recirculating fans and ducts in the refrigeration systems and heated air systems to circulate ambient temperature air through the other elements of the MUST hospital. Vent openings in the return air inlet panel may be opened as required to admit make up air.


SYMBOLS
LIQUID
GAS
PURGE VALVE
OVER PRESSURE SWITCH
ORIFICE
PURGE VALVE
REFRIGERANT COMPRESSOR
COMPRESSOR OVER-TEMPERATURE SWITCH
CONDENSER COOLING FAN
CONDENSER COOLING AIR INLET
COMPRESSOR BYPASS VALVE
AIR CONDITIONING TEMPERATURE CONTROLLER
CONDENSER COOLING AIR OUTLET
ORIFICE
FILTER DRIER
ANTI-ICING SENSOR
TEMPERATURE SENSORS
FRESH AIR IN
SHELTER RETURN AIR
SHELTER RETURN AIR
FRESH AIR IN
REFRIGERANT CONDENSER
CONDITIONED AIR OUT
REFRIGERATION DE-ICING VALVE
AIR FILTER
RECIRCULATING FAN
EVAPORATOR
EXPANSION VALVE
REFRIGERANT LEVEL SIGHT GLASS
REFRIGERATION VALVE
REFRIGERANT RECEIVER
SCREEN
REFRIGERANT CHARGE VALVE

ONE SYSTEM ONLY SHOWN

ME-5-6115-434-12/1-10

Figure 1-10. Cooled air system schematic.

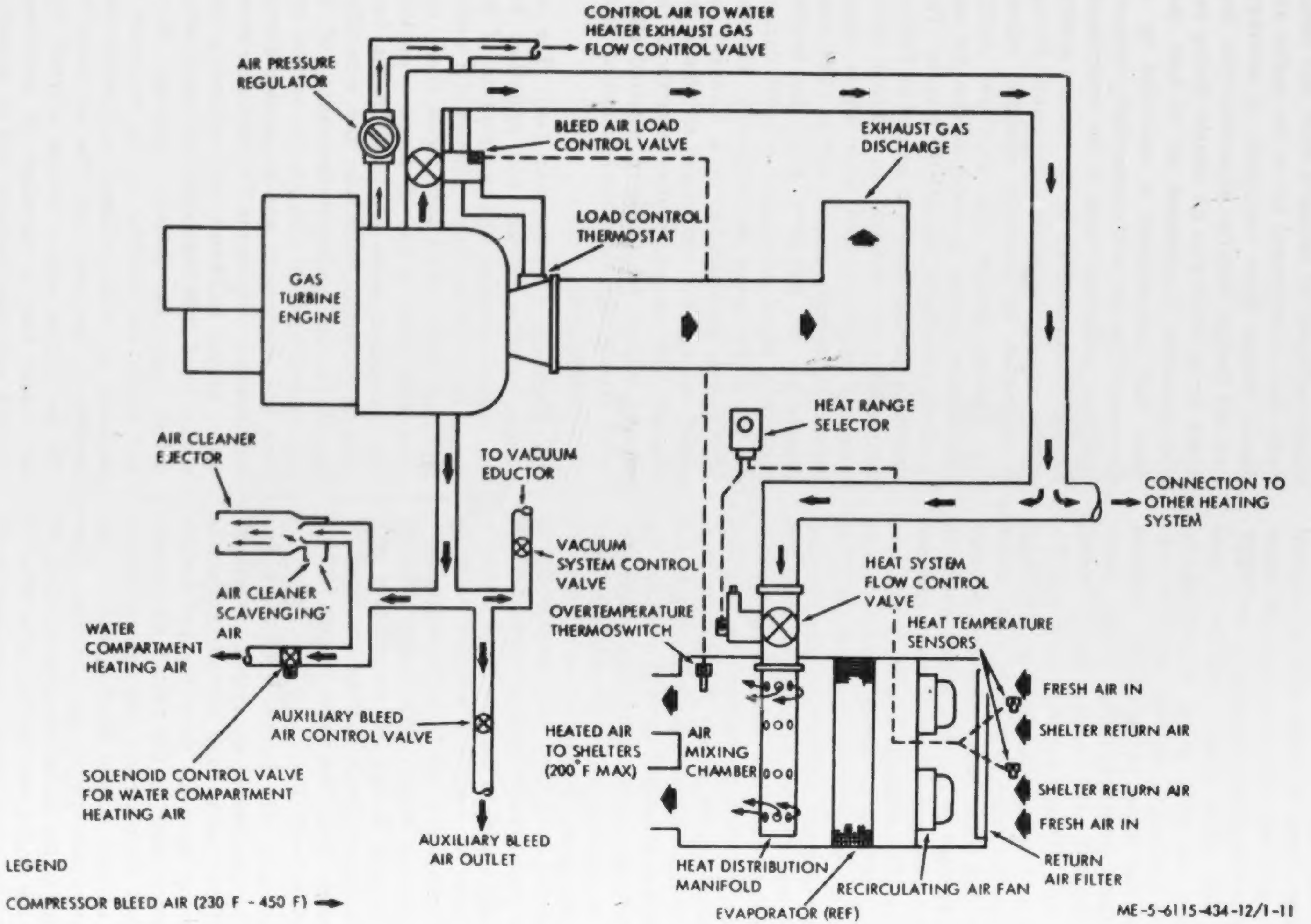

CONTROL AIR TO WATER HEATER EXHAUST GAS FLOW CONTROL VALVE
AIR PRESSURE REGULATOR
BLEED AIR LOAD CONTROL VALVE
EXHAUST GAS DISCHARGE
LOAD CONTROL THERMOSTAT
GAS TURBINE ENGINE
HEAT RANGE SELECTOR
AIR CLEANER EJECTOR
TO VACUUM EDUCTOR
CONNECTION TO OTHER HEATING SYSTEM
VACUUM SYSTEM CONTROL VALVE
AIR CLEANER SCAVENGING AIR
HEAT SYSTEM FLOW CONTROL VALVE
OVERTEMPERATURE THERMOSWITCH
WATER COMPARTMENT HEATING AIR
HEAT TEMPERATURE SENSORS
FRESH AIR IN
SHELTER RETURN AIR
SHELTER RETURN AIR
FRESH AIR IN
AUXILIARY BLEED AIR CONTROL VALVE
HEATED AIR TO SHELTERS (200° F MAX)
AIR MIXING CHAMBER
SOLENOID CONTROL VALVE FOR WATER COMPARTMENT HEATING AIR
AUXILIARY BLEED AIR OUTLET
HEAT DISTRIBUTION MANIFOLD
RECIRCULATING AIR FAN
RETURN AIR FILTER
EVAPORATOR (REF)
LEGEND
COMPRESSOR BLEED AIR (230 F - 450 F) →
ME-5-6115-434-12/1-11

Figure 1-11. Heated air system schematic.

e. Water System (fig. 1-12 and 1-13). The water system, when provided with an external supply of water will deliver hot and cold water under pressure to other elements of the MUST hospital. The water system includes a cold water pump, hot water pump, exhaust-gas-to-water heat exchanger, exhaust gas flow control valve, hot water storage tank, pressure (surge) tank, pressure relief valves, check valves, pressure and temperature control switches, and interconnecting lines and fittings. The cold water pump receives inlet water and delivers the water to the cold water outlet and to the hot water heat exchanger. A surge tank is connected to the cold water system to prevent the noise and effects of water hammer and cycling. The water is heated in the heat exchanger and goes to the hot water storage tank. The hot water pump draws water from the storage tank and delivers it under pressure to the hot water outlet. Pressure switches are utilized to activate the hot and cold water pumps as required to maintain a constant water pressure in the system. A hot water temperature switch controls the positioning of the exhaust gas flow control valve to regulate the flow of exhaust gas to the heat exchanger and maintain a constant water temperature. Temperature and pressure relief valves in the water system protect the system from damage due to excessive temperature and/or pressure. A thermostatic switch in the water tank compartment is used to control a solenoid valve to bleed hot compressed air from the engine compressor into the water tank compartment to prevent freezing during low temperature periods of operation. Drain fittings are provided to completely drain the water system during periods of inoperation.

f. Compressed Air System (fig. 1-11 and 1-14). The compressed air system consists of various ducts, valves, and controls utilized to deliver compressed air from the gas turbine engine compressor to the heated air system, water tank compartment, engine air cleaner ejector, vacuum system eductor, and for external pneumatic power requirements. Compressed air to the heated air system is bled off through the engine load control valve which is modulated by a load control thermostat in the engine exhaust to prevent the engine from being overloaded by excessive shaft and pneumatic loads. Compressed air to the engine air cleaner ejector flows continually to scavenge dust and foreign material separated from the intake air by the engine air cleaner during engine operation. Compressed air to heat the water tank compartment is controlled by a thermostatic switch in the water tank compartment and a solenoid valve in the compressed air line. Compressed air to the vacuum system eductor and to the external pneumatic fitting is controlled by manually operated valves.

g. Vacuum System (fig. 1-11 and 1-15). The vacuum system provides suction for use in other elements of the MUST hospital. The suction or partial vacuum is created by flowing compressed air through an eductor which creates a partial vacuum when air is passed through a venturi shaped section. The compressed air is exhausted from the eductor through a sound attenuated exhaust duct at the top of the power unit enclosure. The vacuum system is controlled by a manually operated valve in the compressed air line to the eductor. The vacuum system consists of an eductor, manual control valve, a sound attenuated exhaust duct, and interconnecting ducts and fittings.

h. Enclosure (fig. 1-1 and 1-2). The enclosure provides support and protection for the various systems and components of the power unit. The enclosure consists of a welded aluminum alloy frame with access doors and removable panels to provide access to controls and instrument panels and to all internal components. Internal bulkheads and separating panels provide compartmentalization of the enclosure interior to separate the various systems and components and to provide storage for accessory components. The enclosure access doors, panels, bulkheads, and separating panels are lined with insulating and sound attenuation materials. Suitable openings, doors, and panels are provided in the enclosure to facilitate air intake, exhaust, and service connections to the power unit. The air intake for the gas turbine engine utilizes a vortex type air cleaner that is scavenged by compressed air with scavenged material and air exhausted

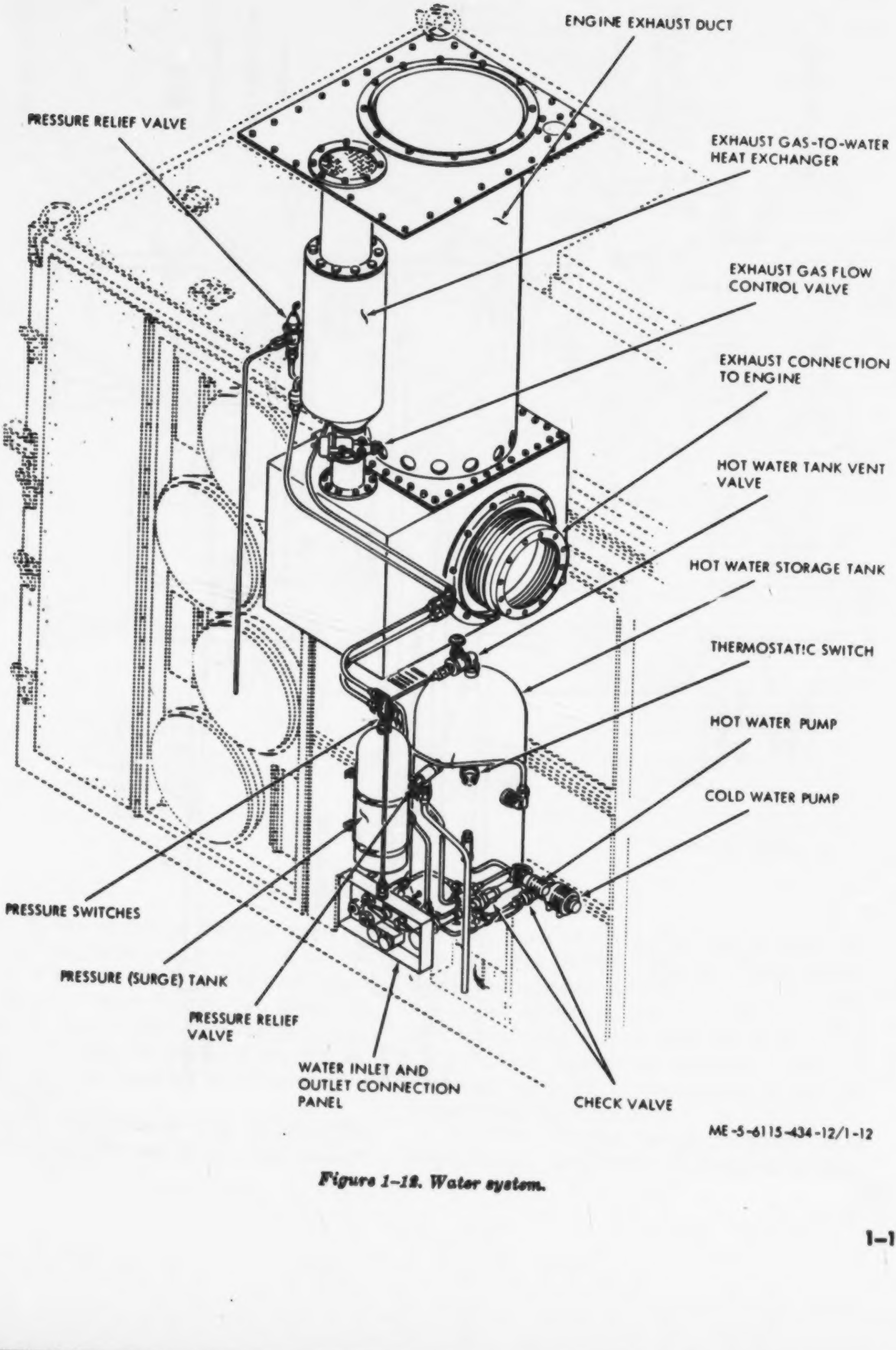
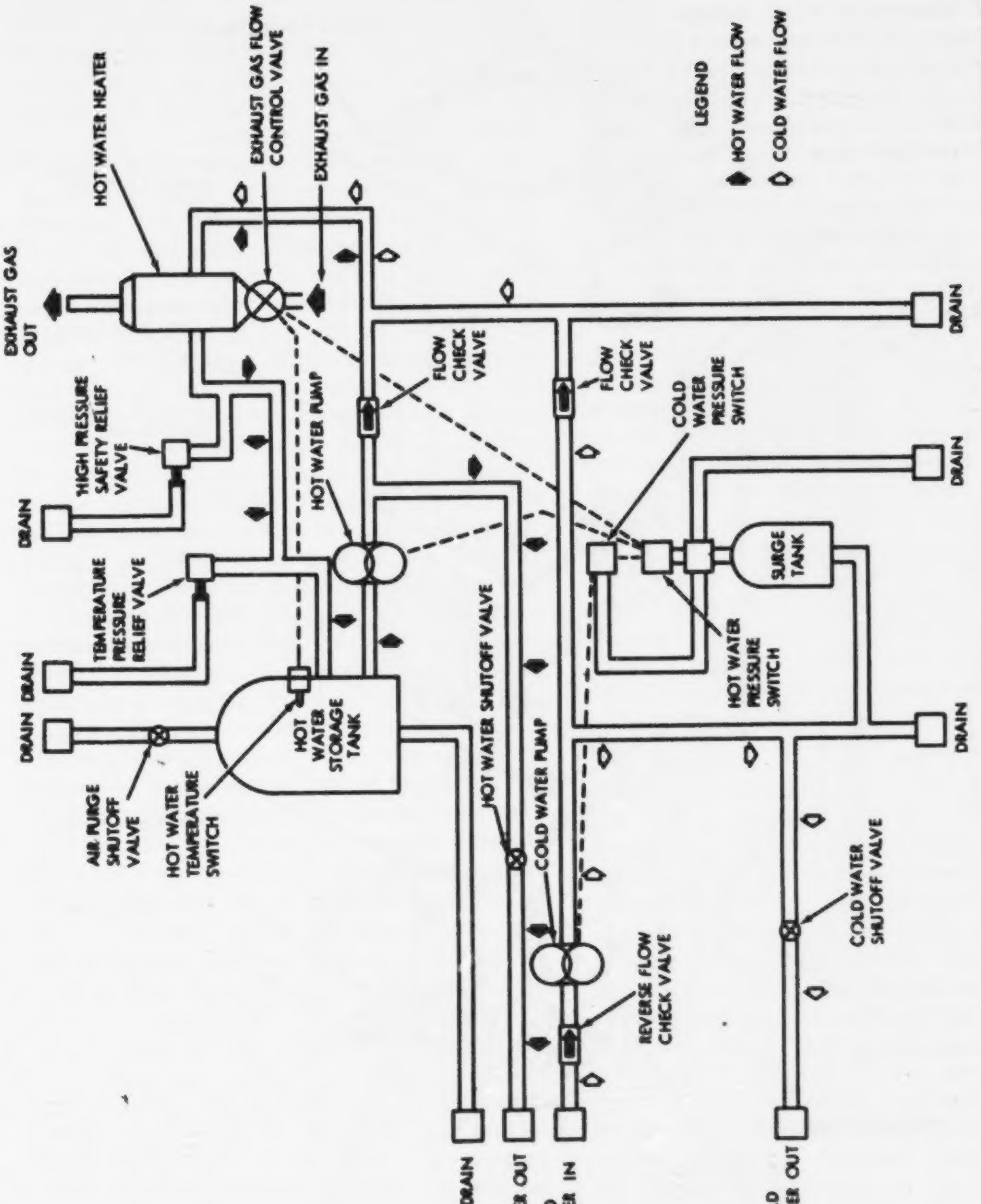

ENGINE EXHAUST DUCT
PRESSURE RELIEF VALVE
EXHAUST GAS-TO-WATER HEAT EXCHANGER
EXHAUST GAS FLOW CONTROL VALVE
EXHAUST CONNECTION TO ENGINE
HOT WATER TANK VENT VALVE
HOT WATER STORAGE TANK
THERMOSTATIC SWITCH
HOT WATER PUMP
COLD WATER PUMP
PRESSURE SWITCHES
PRESSURE (SURGE) TANK
PRESSURE RELIEF VALVE
WATER INLET AND OUTLET CONNECTION PANEL
CHECK VALVE
ME-5-6115-434-12/1-12

Figure 1-12. Water system.


EXHAUST GAS OUT
HOT WATER HEATER
EXHAUST GAS FLOW CONTROL VALVE
EXHAUST GAS IN
HIGH PRESSURE SAFETY RELIEF VALVE
DRAIN
TEMPERATURE PRESSURE RELIEF VALVE
DRAIN
DRAIN
AIR PURGE SHUTOFF VALVE
HOT WATER TEMPERATURE SWITCH
HOT WATER STORAGE TANK
HOT WATER PUMP
FLOW CHECK VALVE
FLOW CHECK VALVE
COLD WATER PRESSURE SWITCH
HOT WATER PRESSURE SWITCH
SURGE TANK
DRAIN
DRAIN
DRAIN
HOT WATER SHUTOFF VALVE
COLD WATER PUMP
REVERSE FLOW CHECK VALVE
COLD WATER SHUTOFF VALVE
DRAIN
HOT WATER OUT
COLD WATER IN
COLD WATER OUT
LEGEND
♦ HOT WATER FLOW
◇ COLD WATER FLOW

ME-5-6115-434-12/1-13

Figure 1-13. Water system schematic.

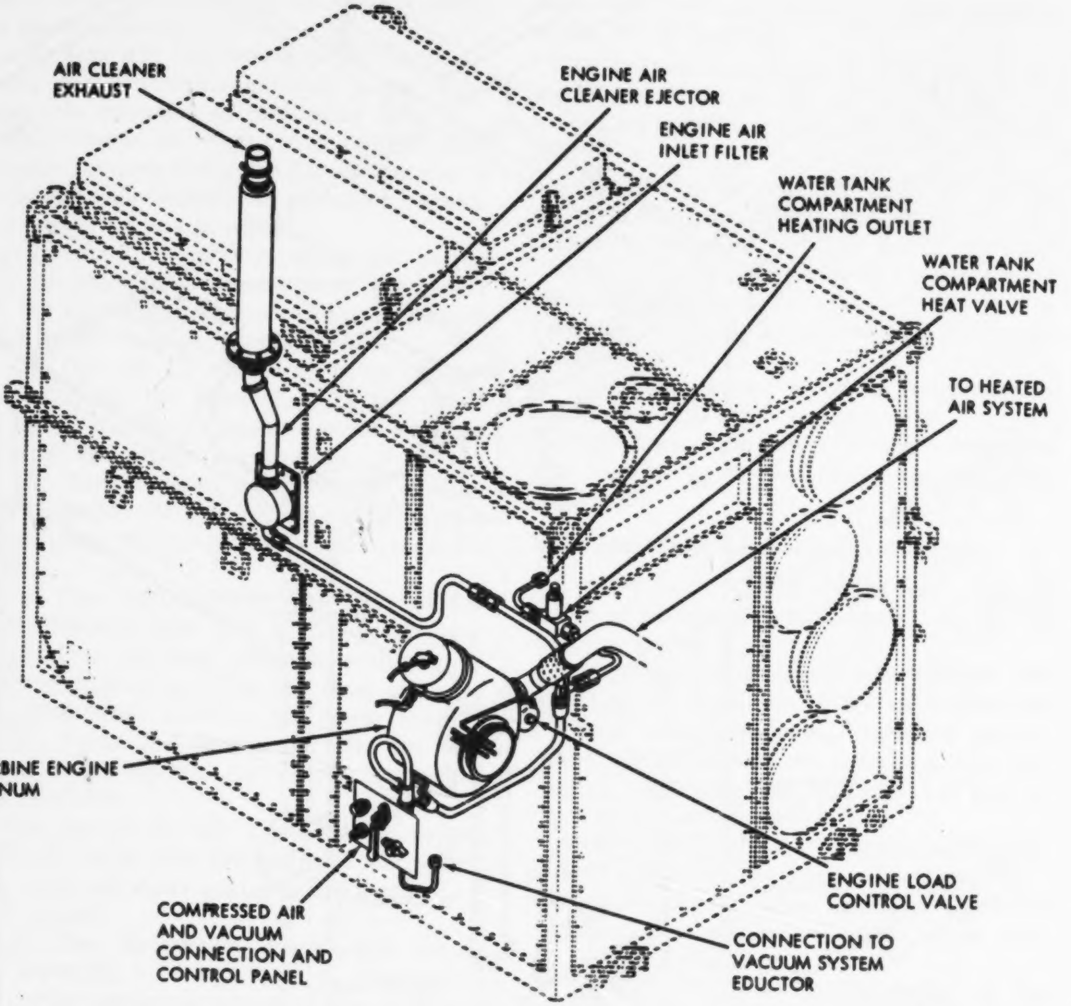

AIR CLEANER EXHAUST
ENGINE AIR CLEANER EJECTOR
ENGINE AIR INLET FILTER
WATER TANK COMPARTMENT HEATING OUTLET
WATER TANK COMPARTMENT HEAT VALVE
TO HEATED AIR SYSTEM
TURBINE ENGINE PLENUM
ENGINE LOAD CONTROL VALVE
COMPRESSED AIR AND VACUUM CONNECTION AND CONTROL PANEL
CONNECTION TO VACUUM SYSTEM EDUCTOR
ME-5-6115-434-12/1-14

Figure 1-14. Compressed air system.

at the top of the enclosure. Folding steps are provided at the right rear corner of the enclosure for access to the top of the enclosure. The enclosure is supported on two shock absorbing skids. Tie downs, lift rings, and other connection hardware is provided on the enclosure to facilitate handling and transporting the power unit.

i. Accessory Components (fig. 1-16). The accessory components are those items utilized for connection of the power unit to other elements of the MUST hospital. These components are supplied with the power unit and are stored in the unit for shipment. The accessory components consist of the following items.

(1) One external dc electrical power input cable assembly for connection of and external 24v dc power source.

(2) One external battery dc power cable assembly for connection of external battery

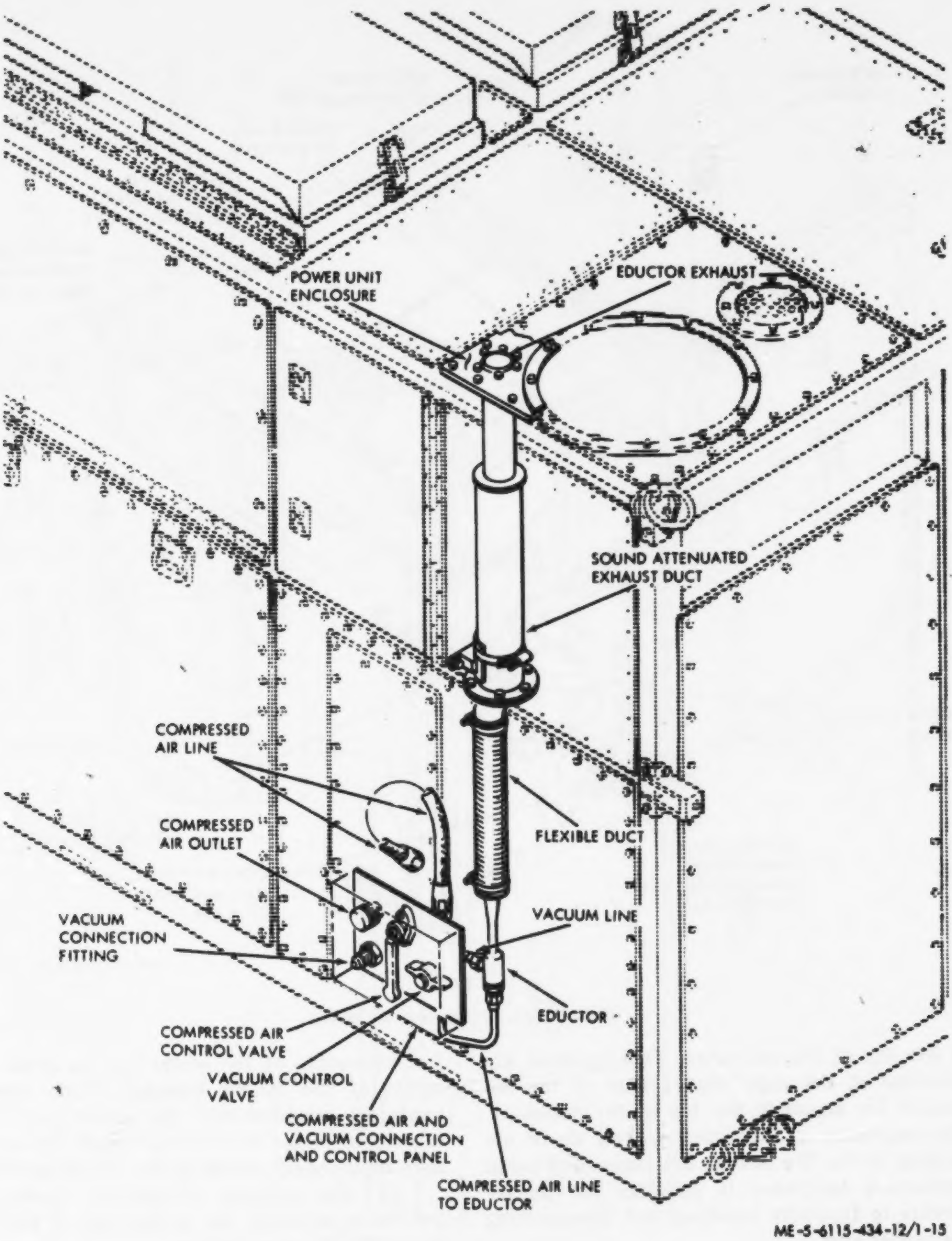

POWER UNIT ENCLOSURE
EDUCTOR EXHAUST
SOUND ATTENUATED EXHAUST DUCT
COMPRESSED AIR LINE
COMPRESSED AIR OUTLET
FLEXIBLE DUCT
VACUUM LINE
VACUUM CONNECTION FITTING
EDUCTOR
COMPRESSED AIR CONTROL VALVE
VACUUM CONTROL VALVE
COMPRESSED AIR AND VACUUM CONNECTION AND CONTROL PANEL
COMPRESSED AIR LINE TO EDUCTOR
ME-5-6115-434-12/1-15

Figure 1-15. Vacuum system.

from a military vehicle equipped with a 24v dc output receptacle to the power unit for auxiliary starting power.

(3) One 400 Hz remote power cable assembly for connection between power units for remote operation of centilating fans.

(4) One dc electrical power standby cable assembly for connecting the 24v dc systems of two power units together to provide for standby operation of one power unit.

(5) One 400 Hz electrical power output cable assembly for connection of the power unit 400 Hz electrical system to other elements of the MUST hospital as required.

(6) One 60 Hz electrical power output cable assembly for connection of the power unit 60 Hz electrical system to other elements of the MUST hospital as required.

(7) One remote temperature sensing cable assembly for connection of a remote thermostat to the power unit conditioned air system.

(8) One dual element fuel filter assembly for filtering inlet fuel to the power unit.

(9) One fuel hose assembly with shutoff valve for connection of the fuel filter assembly to the fuel inlet fitting on the power unit.

(10) Three fuel hose assemblies for connection of an external fuel source to the fuel filter assembly.

(11) One electrically heated water supply and drain water hose assembly for connection of an external water source to the power unit water system.

(12) One electrically heated dual water hose assembly for connection of the power unit water system to other elements of the MUST hospital.

(13) One compressed air hose assembly for connection of the power unit compressed air hose assembly for connection of the power unit compressed air outlet to the MUST hospital inflatable elements for delivery of inflation air.

(14) One vacuum hose assembly for connecion of the power unit vacuum system to other elements of the MUST hospital that require vacuum service.

(15) Eight conditioned air duct assemblies for connection of the power unit conditioned air duct assemblies for connection of the power unit conditioned air system to other elements of the MUST hospital.

(16) Four conditioned air duct adapter assemblies used to join the air conditioning duct assemblies together as required for additional length.

(17) One inflation and deflation ejector assembly used to inflate and/or deflate the inflatable elements of the MUST hospital.

(18) One junction box and valve manifold assembly used to connect the inflation ejector assembly to the inflation manifold of the inflatable element.

(19) One divider panel to separate the conditioned air outlet compartment.

(20) Two drain hoses to drain condensation from the upper conditioned air outlet compartment.

1-4. Identification and Tabulated Data

a. Identification. The power unit has 14 major identification plates and 11 major instruction plates.

(1) *Power unit identification plate.* Located on the right side of the unit above the electrical connection panel. Specifies the nomenclature, stock number, serial number, part number, model number, contract number, series number, and manufacturer.

(2) *Gas turbine engine identification plate.* Located on the engine accessory drive housing on the left side. Specifies nomenclature, part number, model number, serial number, and manufacturer.

(3) *400 Hz generator.* Located on left side of generator housing. Specifies nomenclature, part number, style, rated rpm, frequency, serial number, kva (kilovolt amperes) rating, P/F (power factor), ampere rating, voltage, and manufacturer.

(4) *60 Hz generator.* Located on side of generator housing. Specifies nomenclature, part number, style, rated rpm, frequency, serial number, kva rating, P/F, ampere rating, voltage, and manufacturer.

(5) *Refrigeration compressors (2 used).* Located on compressor inlet housing. Specifies nomenclature, serial number, part number, voltage, cycles, phase, amperes, duty cycle,

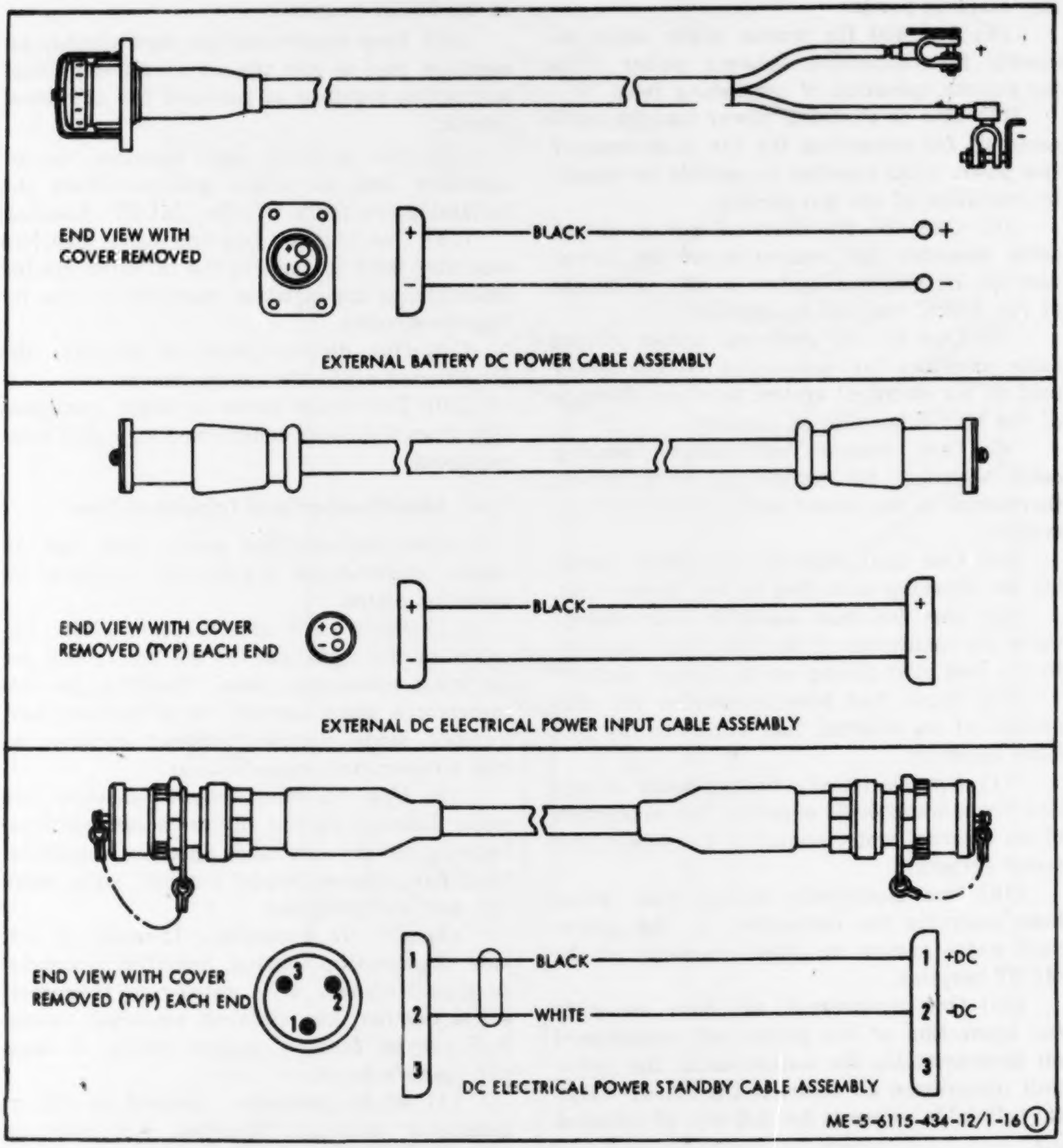

+
-
END VIEW WITH
COVER REMOVED
+
-
BLACK
+
-
EXTERNAL BATTERY DC POWER CABLE ASSEMBLY
END VIEW WITH COVER
REMOVED (TYP) EACH END
+
-
BLACK
+
-
EXTERNAL DC ELECTRICAL POWER INPUT CABLE ASSEMBLY
END VIEW WITH COVER
REMOVED (TYP) EACH END
3
2
1
1
2
3
BLACK
WHITE
1 +DC
2 -DC
3
DC ELECTRICAL POWER STANDBY CABLE ASSEMBLY
ME-5-6115-434-12/1-16①

Figure 1-16. Accessory components (Sheet 1 of 2).

rpm, refrigerant, rating, evaporator temperature, condenser temperature, and manufacturer.

(6) *Evaporators (2 used).* Located on top of evaporator tank. Specifies nomenclature, part number, and manufacturer.

(7) *Condensers (2 used).* Located on condensor frame. Specifies nomenclature, part number, and manufacturer.

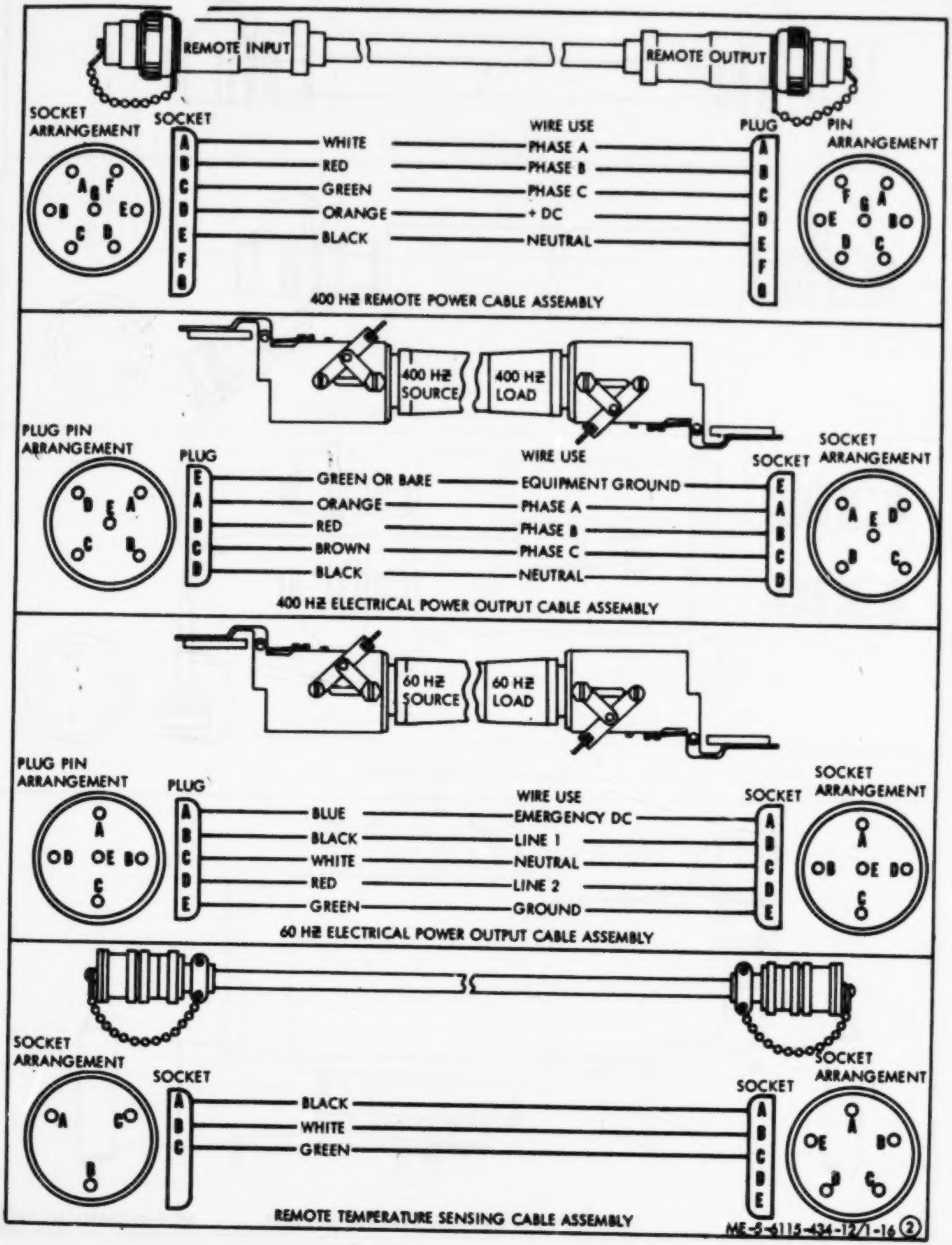
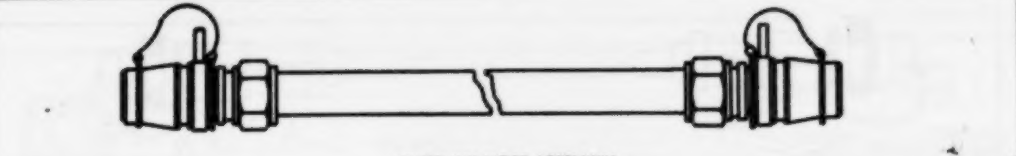
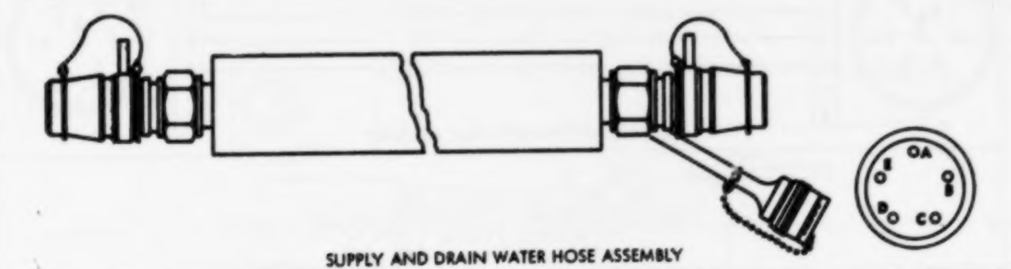

REMOTE INPUT
REMOTE OUTPUT
SOCKET ARRANGEMENT
SOCKET
WIRE USE
PLUG
PIN ARRANGEMENT
WHITE
PHASE A
RED
PHASE B
GREEN
PHASE C
ORANGE
+ DC
BLACK
NEUTRAL
A B C D E F G
400 HZ REMOTE POWER CABLE ASSEMBLY
400 HZ SOURCE
400 HZ LOAD
PLUG PIN ARRANGEMENT
PLUG
WIRE USE
SOCKET
SOCKET ARRANGEMENT
GREEN OR BARE
EQUIPMENT GROUND
ORANGE
PHASE A
RED
PHASE B
BROWN
PHASE C
BLACK
NEUTRAL
E A B C D
400 HZ ELECTRICAL POWER OUTPUT CABLE ASSEMBLY
60 HZ SOURCE
60 HZ LOAD
PLUG PIN ARRANGEMENT
PLUG
WIRE USE
SOCKET
SOCKET ARRANGEMENT
BLUE
EMERGENCY DC
BLACK
LINE 1
WHITE
NEUTRAL
RED
LINE 2
GREEN
GROUND
A B C D E
60 HZ ELECTRICAL POWER OUTPUT CABLE ASSEMBLY
SOCKET ARRANGEMENT
SOCKET
BLACK
WHITE
GREEN
A B C
SOCKET
SOCKET ARRANGEMENT
A B C D E
REMOTE TEMPERATURE SENSING CABLE ASSEMBLY
ME-5-6115-434-12/1-16 ②

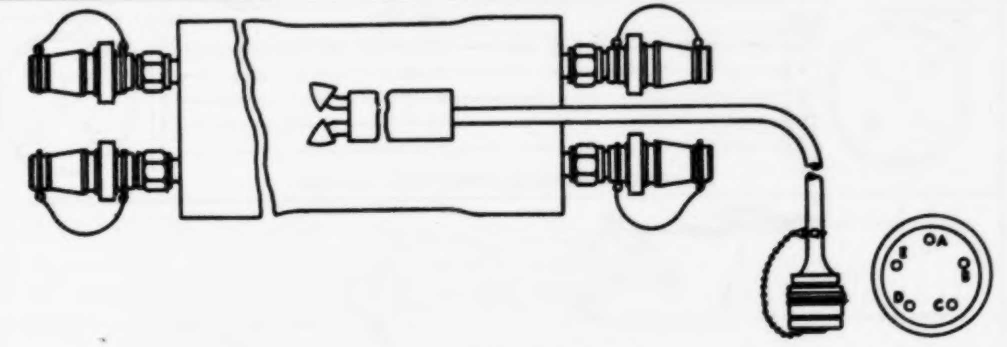
Figure 1-16. Accessory components (Sheet 2 of 5).



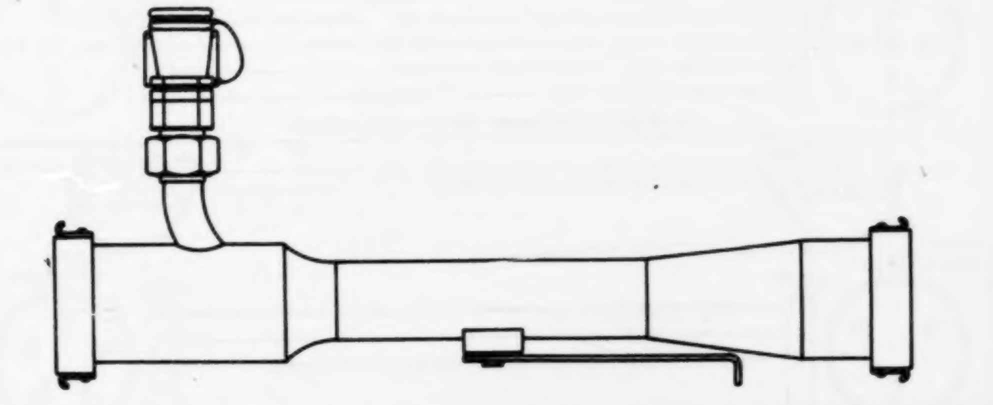
BLEED AIR HOSE ASSEMBLY



SUPPLY AND DRAIN WATER HOSE ASSEMBLY



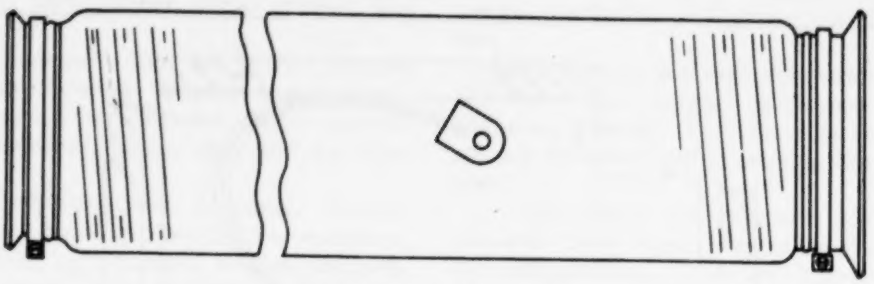
DUAL WATER HOSE ASSEMBLY



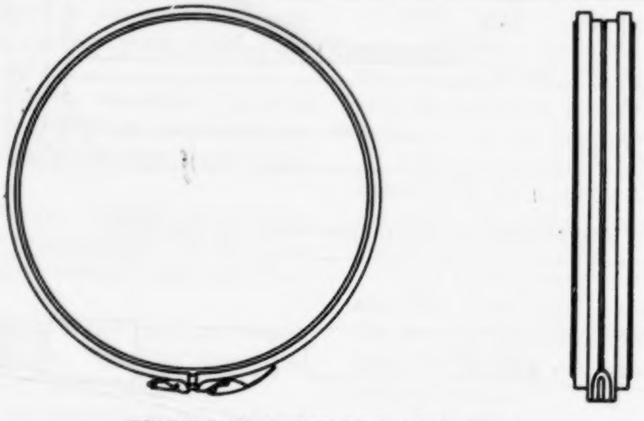
INFLATION AND DEFLATION EJECTOR ASSEMBLY

ME-5-6115-434-12/1-16③

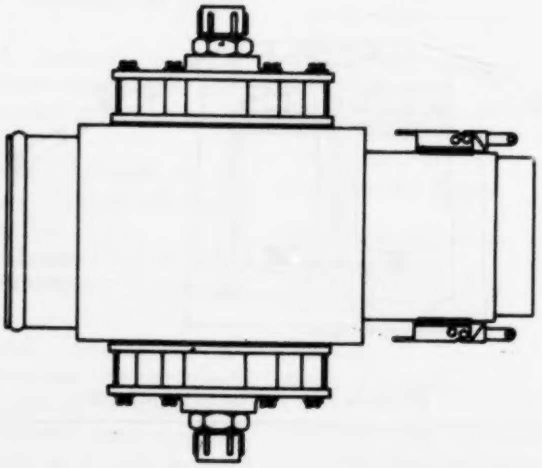
Figure 1-16. Accessory components (Sheet 3 of 5).



CONDITIONED AIR DUCT ASSEMBLY



CONDITIONED AIR DUCT COUPLING ASSEMBLY



JUNCTION BOX AND VALVE MANIFOLD ASSEMBLY

ME-5-6115-434-12/1-16 ④

Figure 1-16. Accessory components (Sheet 4 of 5).

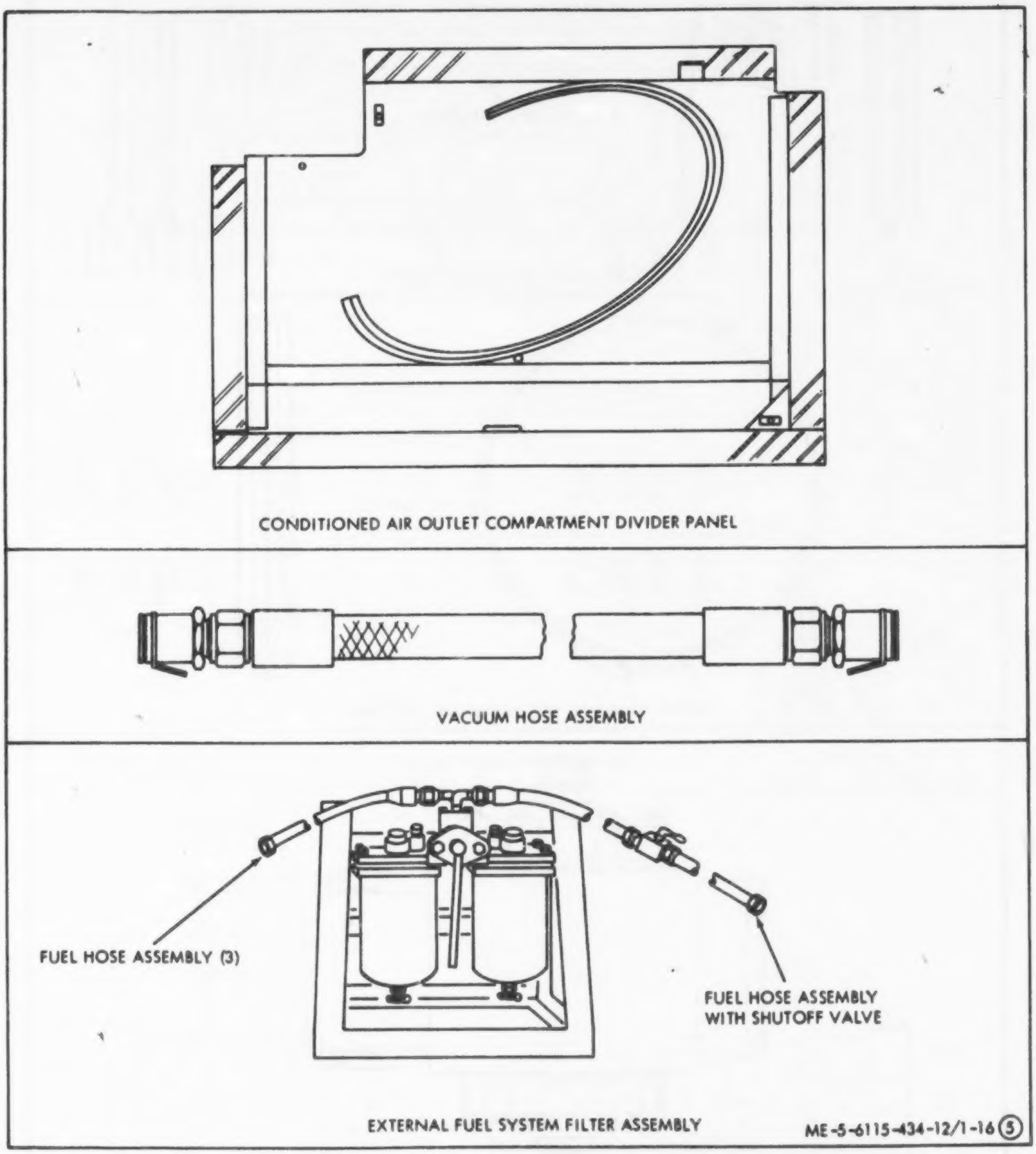

CONDITIONED AIR OUTLET COMPARTMENT DIVIDER PANEL
VACUUM HOSE ASSEMBLY
FUEL HOSE ASSEMBLY (3)
FUEL HOSE ASSEMBLY
WITH SHUTOFF VALVE
EXTERNAL FUEL SYSTEM FILTER ASSEMBLY
ME-5-6115-434-12/1-16 ⑤

Figure 1-16. Accessory components (Sheet 5 of 5).

(8) *Refrigerant receivers (2 used).* Located on side of receiver tank. Specifies nomenclature, part number, serial number, and manufacturer.

(9) *Condenser fans (4 used).* Located on fan motor housing. Specifies nomenclature, air flow rating, part number, serial number, voltage, frequency, phase, rpm, and manufacturer.

(10) *Ventilating fans (4 used).* Located on fan motor housing. Specifies nomenclature, airflow rating, part number, voltage, amperes, frequency, phase, rpm, and manufacturer.

(11) *60 Hz voltage regulator.* Located on regulator cover. Specifies nomenclature, voltage, Hz, phase, part number, style, serial number, and manufacturer.

(12) *400 Hz voltage regulator.* Located on regulator cover. Specifics nomenclature, part number, style, serial number, and manufacturer.

(13) *Battery charger.* Located on charger enclosure. Specifies nomenclature, model number, input, output, part number, and manufacturer.

(14) *Exhaust gas to water heat exchanger.* Located on side of tank. Specifies nomenclature, part number, and manufacturer.

(15) *Operating instructions decal.* Located on controls and instruments panel access door. Provides instructions for operating the power unit.

(16) *Fuel inlet decal.* Located on lower left front corner of enclosure above fuel inlet fitting. Provides recommended and emergency fuels specifications.

(17) *Oil fill door decal.* Located on oil fill access door. Provides lubricating oil specification and oil change period.

(18) *Engine oil label.* Located on oil tank above filler cap. Provides engine oil system capacity.

(19) *Refrigeration label.* Located on inside or refrigeration compressor compartment above refrigeration compressors, in condenser compartments, and in refrigerant receiver compartments. Provides warning as to refrigerant to be used.

(20) *Remote sensor decal.* Located in the lower right corner of the return air panel adjacent to the remote temperature sensing connector. Provides caution instructions pertaining to installation of shorting plug in connector.

(21) *Turbine air inlet compartment stowable items label.* Located on the inside wall of the compartment. Provides instructions for storing accessory components in the compartment.

(22) *Upper left condenser compartment stowable items label.* Located on the floor of the compartment. Provides instructions for storing accessory components in the compartment.

(23) *Upper right condenser compartment stowable items label:* Located on the floor of the compartment. Provides instructions for storing accessory components in the compartment.

(24) *Compressor compartment stowable items label.* Located on the floor of the compartment. Provides instructions for storing accessory components in the compartment.

(25) *Conditioned air outlet compartment stowable items label.* Located on the inside of the door to the compartment. Provides instructions for storing accessory components in the compartment.

b. *Tabulated ata.*

(1) *Overall dimensions and weights.*

Overall length (operating).	145.00 in. (inch)
Overall length (storage or shipping).	114.36 in.
Overall width (operating)	112.00 in.
Overall width (storage or shipping).	72.00 in.
Overall height (operating).	112.00 in.
Overall height (storage or shipping).	91.75 in.
Net weight empty (dry)	3,800 lb. (pounds) (max)
Net weight filled (accessory components stowed).	4,500 lb. (max)
Shipping volume	480 cu ft (cubic feet) (max)
Shipping weight	4,500 lb. (max)

(2) *Gas turbine engine.*

Manufacturer	AiResearch Manufacturing Company of Arizona
Part number	380278-1-2
Model number	GTCP85-127

Type	Combination pneumatic and shaft power
Turbine wheel type	Single stage, radial inward flow.
Compressor type	Two stage centrifugal
Combustion chamber	Single reverse flow tube
Acceleration time to governed speed.	60 seconds (max)
Inlet air temperature	130°F (54°C) (max)

(*a*) *Fuel requirements.*

Recommended Fuels

Jet fuel, grade JP-4 (-65° to 140°F) (-54° to 60°C).	MIL-T-5624
Jet fuel, grade JP-5 (-30° to 140°F) (-34° to 60°C).	MIL-T-5624
Compression ignition fuel (-30° to 140°F) (-34° to 60°C).	MIL-F-46005
Oil, diesel, grade DF2 (30° to 140°F) (-1° to 60°C).	VV-F-800
Oil, diesel, grade DFA (-65° to 140°F) (-54° to 60C°).	VV-F-800
Kerosene (-30° to 140°F) (-34° to 60°C).	EMS 309
Fuel oil, diesel marine (30° to 140°F) (-1° to 60°C).	MIL-F-16884

Emergency Fuels (50-hours continuous operation maximum).

Note. Power unit performance will be satisfactory but use of the following fuels will result in increased gas turbine engine maintenance.

Gasoline, automotive combat (-65° to 140°F) (-54° to 60°C).	MIL-G-3056
Gasoline, aviation, grades 80/97, 91/96, 100/130, 115/145 (-65° to 140°F) (-54° to 60°C).	MIL-G-5572

(*b*) *Lubrication requirements.*

Lubricating oil	MIL-L-7808 MIL-L-23699
Lubricating system capacity.	10 U.S. quarts
Oil change period	500 hours
Oil temperature, starting	-65° to 140°F (-54° to 60°C).
Oil temperature, operating	255°F (124°C) (max)
Oil pump discharge pressure.	90 ± 10 psig
Oil consumption	0.25 pounds per hour (max)

(*c*) *Exhaust gas temperatures.*

Continuous operation, rated full load.	1225°F (663°C) (max)
Transient conditions	1300°F (704°C) (max)
Acceleration control thermostat setting.	1240° to 1260°F (671° to 682°C)
Load control thermostat setting.	1025° to 1075°F (552° to 579°C)

(*d*) *Operating speeds.*

Turbine wheel governed speed, rated full load (100-percent).	40,700 ± 100 rpm
Turbine wheel governed speed, no load.	41,600 (max)
Overspeed shutdown switch actuation.	44,250 ± 250 rpm
Engine output shaft speed.	6000 rpm
Speed ratio, turbine wheel to tachometer generator drive.	9.806 to 1.0

(3) *24v dc electrical system.*

Batteries (2 required connected in series).	12v, 45 ampere hour lead-acid per MIL-B-26220 and MS35000, 2HN
Battery charger:	
Manufacturer	AiResearch Manufacturing Company of Arizona
Part number	695614-1
Model number	KR-A-006-1
Input	120/208v ac, 400 Hz
Output	28v dc, 30 amps
Type	Transformer-rectifier
Engine starter motor:	
Manufacturer	AiResearch Manufacturing Company of Arizona
Part number	372697-9
Current	600 amp (momentary)
Duty cycle	One minute, on, one minute off or five starts in ten minutes.
Fuel boost pump:	
Manufacturer	AiResearch Manufacturing Company of Arizona
Part number	371240-2
Discharge pressure	15.0 psig (max)
Current requirements	2.0 amps
Engine electrical system power requirements (until light-off).	7.5 amps

Emergency lighting power requirements.	10.0 amps

(4) *60 Hz electrical system.*

Rating	120/240v ac, 60 Hz, single phase, 3-wire.
Neutral conductor	Ungrounded
Internal 60 Hz power requirements.	None
Power available for external requirements.	12.5 kva, 10 kw at 0.80 pf
Generator:	
Manufacturer	Bendix Corp., Red Bank Div.
Part number	51B8-3-A
PMG (permanent magnet generator) voltage.	23 ± 1 v
Type	Single phase, 3 wire
P/F (power factor)	0.80
KVA	12.5
KW	10.0
Frequency	60Hz
Volts	120/240v
Rated rpm	3,600
Weight	118 lbs
Voltage regulator:	
Manufacturer	Bendix Corp., Red Bank Div.
Part number	20B123-1
Style	B
Type	Solid state
Volts	120/240
Frequency	60 Hz
Phase	1
Adjustable range	115 to 125 volts line to neutral
Sensing	Average phase with high phase limiting on overvoltage. Average phase with low phase control on undervoltage.

(5) *400 Hz electrical system.*

Rating	120/208v ac, 400 Hz, three phase, 4-wire
Neutral conductor	Grounded
Output:	
Total	120 kva, 96 kw at 0.80 P/F
External with air conditioning or heating.	30 kw
External with no air conditioning or heating.	90 kw
Refrigeration compressor power requirement, each (2 in system).	19.5 kw (nominal)
Condenser cooling fan power requirement, each (4 in system).	4.9 kw
Recirculating fan power requirement, each (4 in system).	1.95 kw
Water pump power requirement, each (2 in system).	0.23 kw
Generator:	
Manufacturer	Bendix Corp., Red Bank Div.
Part number	28B94-15
Style	A
PMG voltage	29 ± 1
Type	Three phase, 4-wire
P/F	0.80
KVA	120
KW	96
Frequency	400 Hz
Volts	120/208
Amps	333
Rated rpm	6000
Weight	133 lbs
Voltage regulator:	
Manufacturer	Bendix Corp., Red Bank Div.
Part number	20B100-2
Style	A
Type	Solid state
Volts	120/208
Frequency	400 Hz
Phase	3
Adjustable range	115 to 125 volts line to neutral
Sensing	Average 3 phase

(6) *Conditioned air system.*

Heating capacity (at sea level and ambient temperature -25°F (-4°C)).	350,000 btu/hr
Cooling capacity, each system (two systems used).	10 tons (approx) (120,000 btu/hr with 460 cfm make-up air at 120°F (49°C))
Refrigerant specification	R 114 (Federal Specification BB-F-671)
Refrigerant capacity:	
System no. 1 (lower)	39 lb (approx)
System no. 2 (upper)	36 lb (approx)
Refrigerant operating pressure.	70 to 90 psig
Refrigerant maximum pressure.	110 psig
Refrigeration oil capacity:	
System no. 1 (lower)	590 cc (approx)
System no. 2 (upper)	540 cc (approx)
System no. 1 (lower), for recharge only.	197 cc (approx)

System no. 2 (upper), for recharge only.	180 cc (approx)

Refrigeration compressors: (2 used)

Manufacturer	AiResearch Manufacturing Company of Los Angeles
Part number	572030-1-2
Type	Two stage centrifugal
Rpm	23,300
Duty cycle	Continuous
Volts	120/208
Frequency	400 Hz
Phase	3
Amps	60

Refrigerant receivers: (2 used)

Manufacturer	AiResearch Manufacturing Company of Los Angeles
Part	184270-1-1

Refrigerant condensers: (2 used)

Manufacturer	AiResearch Manufacturing Company of Los Angeles
Part number	184260-1-1
Type	Aluminum plate fin

Refrigerant evaporators: (2 used)

Manufacturer	AiResearch Manufacturing Company of Los Angeles
Part number	184250-1-1
Type	Aluminum plate fin

Condenser cooling fan: (4 used)

Manufacturer	AiResearch Manufacturing Company of Los Angeles
Part number	605890-3-1
Type	Single stage, axial flow
Rating	5500 cfm at 2.15 in. of H_2O static pressure
Rpm	3800
Volts	120/208
Frequency	400 Hz
Phase	3
Amps	15

Recirculating fan: (4 used)

Manufacturer	AiResearch Manufacturing Company of Los Angeles
Part number	605370-1-2
Type	Single stage, axial flow
Rating	1620 cfm at 3.45 in. of H_2O static pressure
Rpm	5700
Volts	120/208
Frequency	400 Hz
Phase	3
Amps	6.0

(7) *Water system.*

Hot water pressure at outlet connection.	10 psig
Hot water flow (with no cold water flowing).	6 gpm
Cold water pressure at outlet connection.	10 psig
Cold water flow (with no hot water flowing).	9 gpm
Heat exchanger heating capacity.	60,000 btu/hr at sea level and ambient temperature -65°F (-54°C)
Hot water storage tank capacity.	15 gal (approx)
Hot water temperature at outlet connection.	140° to 160°F (60° to 72°C)
Temperature—pressure relief valve setting.	200°F (93°C), 75 psig
High pressure relief valve setting.	100 psig
Surge tank pressure switch actuation.	40 to 45 psig

(8) *Compressed air system.*

Normal external discharge pressure.	55 to 110 in. Hg A
Pressure through inflation ejector.	1.5 psig (min)
Flow through inflation ejector.	200 scfm (min)

(9) *Vacuum system.*

Vacuum source	Compressed air through eductor
Suction by eductor	10 scfm at 18 to 20 in. Hg A

(10) *Engine fuel and bleed-air control systems schematic.* Refer to figure 1-4.

(11) *Engine electrical system schematic.* Refer to figure 1-5.

(12) *Engine lubrication system schematic.* Refer to figure 1-6.

(13) *Power unit electrical system schematic.* Refer to figure 1-8.

(14) *Cooled air system schematic.* Refer to figure 1-10.

(15) *Heated air system schematic.* Refer to figure 1-11.

(16) *Water system schematic.* Refer to figure 1-13.

(17) *Instrument panel practical wiring diagram.* Refer to figure 1-17.

(18) *Gas turbine engine power plant practical wiring diagram.* Refer to figure 1-18.

(19) *Water system practical wiring diagram.* Refer to figure 1-19.

(20) *Conditioned air system practical wiring diagram.* Refer to figure 1-20.

1-5. Difference in Models

This manual covers Airesearch Power Unit Models PPU85-4 and PPU85-5. The differences between models is the Model PPU85-4 is winterized and Model PPU85-5 is non-winterized.

Figure 1-17. Instrument panel practical wiring diagram.

(Located in back of manual)

Figure 1-18. Gas turbine engine power plant practical wiring diagram (Sheet 1 of 2).

(Located in back of manual)

Figure 1-18. Gas turbine engine power plant practical wiring diagram (Sheet 2 of 2).

(Located in back of manual)

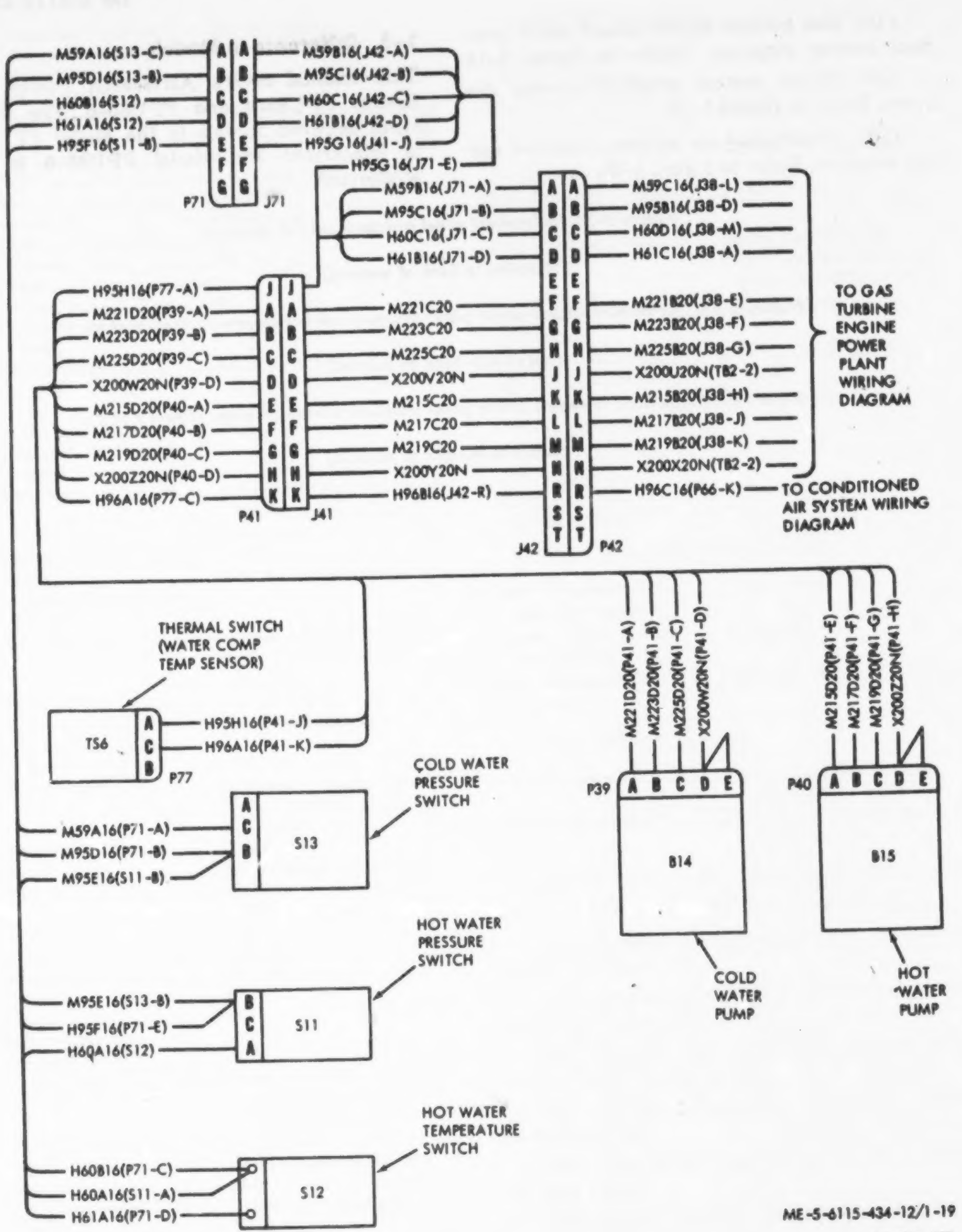

M59A16(S13-C)
M95D16(S13-B)
H60B16(S12)
H61A16(S12)
H95F16(S11-B)
A B C D E F G
A B C D E F G
P71
J71
M59B16(J42-A)
M95C16(J42-B)
H60C16(J42-C)
H61B16(J42-D)
H95G16(J41-J)
H95G16(J71-E)
M59B16(J71-A)
M95C16(J71-B)
H60C16(J71-C)
H61B16(J71-D)
H95H16(P77-A)
M221D20(P39-A)
M223D20(P39-B)
M225D20(P39-C)
X200W20N(P39-D)
M215D20(P40-A)
M217D20(P40-B)
M219D20(P40-C)
X200Z20N(P40-D)
H96A16(P77-C)
J A B C D E F G H K
J A B C D E F G H K
P41
J41
M221C20
M223C20
M225C20
X200V20N
M215C20
M217C20
M219C20
X200Y20N
H96B16(J42-R)
A B C D E F G H J K L M N R S T
A B C D E F G H J K L M N R S T
J42
P42
M59C16(J38-L)
M95B16(J38-D)
H60D16(J38-M)
H61C16(J38-A)
M221B20(J38-E)
M223B20(J38-F)
M225B20(J38-G)
X200U20N(TB2-2)
M215B20(J38-H)
M217B20(J38-J)
M219B20(J38-K)
X200X20N(TB2-2)
H96C16(P66-K)
TO GAS TURBINE ENGINE POWER PLANT WIRING DIAGRAM
TO CONDITIONED AIR SYSTEM WIRING DIAGRAM
THERMAL SWITCH (WATER COMP TEMP SENSOR)
TS6
A C B
P77
H95H16(P41-J)
H96A16(P41-K)
COLD WATER PRESSURE SWITCH
M59A16(P71-A)
M95D16(P71-B)
M95E16(S11-B)
A C B
S13
HOT WATER PRESSURE SWITCH
M95E16(S13-B)
H95F16(P71-E)
H60A16(S12)
B C A
S11
HOT WATER TEMPERATURE SWITCH
H60B16(P71-C)
H60A16(S11-A)
H61A16(P71-D)
S12
M221D20(P41-A)
M223D20(P41-B)
M225D20(P41-C)
X200W20N(P41-D)
P39
A B C D E
B14
COLD WATER PUMP
M215D20(P41-E)
M217D20(P41-F)
M219D20(P41-G)
X200Z20N(P41-H)
P40
A B C D E
B15
HOT WATER PUMP
ME-5-6115-434-12/1-19
W-45A-153

Figure 1-19. Water system practical wiring diagram.

B14	**Cold water pump**
B15	**Hot water pump**
J41	**Receptacle**
J42	**Receptacle**
J71	**Receptacle**
P39	**Plug**
P40	**Plug**
P41	**Plug**
P42	Plug
P71	Plug
P77	Plug
S11	Switch (pressure)
S12	Switch (hot water temperature)
S13	Switch (cold water pressure)
TS6	Thermostat (water compartment heat valve)

Figure 1-19—Continued.

Figure 1-20. Conditioned air system practical wiring diagram (Sheet 1 of 2).

(Located in back of manual)

Figure 1-20. Conditioned air system practical wiring diagram (Sheet 2 of 2).

(Located in back of manual)

CHAPTER 2

INSTALLATION AND OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIAL

2-1. Inspecting and Servicing the Equipment

a. Inspection.

(1) Examine power unit identification plate for positive identification of power unit.

(2) Visually inspect exterior of power unit for evidence of damage that may have occurred during storage or transportation.

Note. Check for plastic indicator tabs on fire extinguisher (fig. 1-1) trigger and nozzle. If indicator tabs are missing, replace fire extinguisher with a new extinguisher.

(3) Open battery access and storage compartment door (fig. 1-1), condenser compartment access doors (fig. 1-1), condenser air outlet doors (fig. 1-1 and fig. 1-2), refrigeration compressors compartment access door (fig. 1-2), conditioned air outlet compartment access door (fig. 1-2), and refrigeration compartment access door (fig. 1-1). Remove all accessory components stowed in the compartments. Visually inspect all removed accessory components for damage and check that all required accessory components are with the unit (para 1-3, *i*). Visually inspect compartment interiors and components installed in the compartments for possible damage caused by stowed accessory components, for accumulations of debris or other foreign material, and for evidence of corrosion. Carefully inspect cooling fins of condensers and evaporators for evidence of corrosion, damage, and accumulation of foreign material.

(4) Open instrument panel access door (fig. 1-1), conditioned air system circuit breaker panel access door (fig. 1-1) and air temperature control panel access door (fig. 1-1). Check that all controls or switches are in the off or neutral position and instruments are indicating the de-energized position. Visually inspect all instruments, switches, indicating lamps, and circuit breakers for damage, legibility of markings, and for evidence of corrosion.

(5) Remove water compartment access panel (fig. 1-1), conditioned air electrical control components access panel (fig. 1-1), fuel and oil components access panel (fig. 1-1), gas turbine engine power plant access panel (fig. 1-2), engine turbine section and heat exchanger access panel (fig. 1-2), and heat exchanger compartment access panel (fig. 1-2). Visually inspect compartment interiors for damage, evidence of corrosion and accumulations of foreign material. Inspect wiring components for frayed or otherwise damaged insulation, burns, and corrosion. Inspect plumbing lines and fittings for evidence of damage, leakage, and corrosion. Inspect all components for secure installation, damage, evidence of leakage, and corrosion.

(6) Check all exhaust openings in top of unit for obstructions and for damage.

(7) All damage or deficiencies that could affect operation of the power unit shall be corrected before operation of the power unit. Damage or deficiencies that would not affect operation immediately shall be noted and corrected as soon as possible.

(8) Replace all access panels and close all doors upon completion of inspection.

b. Battery Servicing.

(1) *Used batteries.*

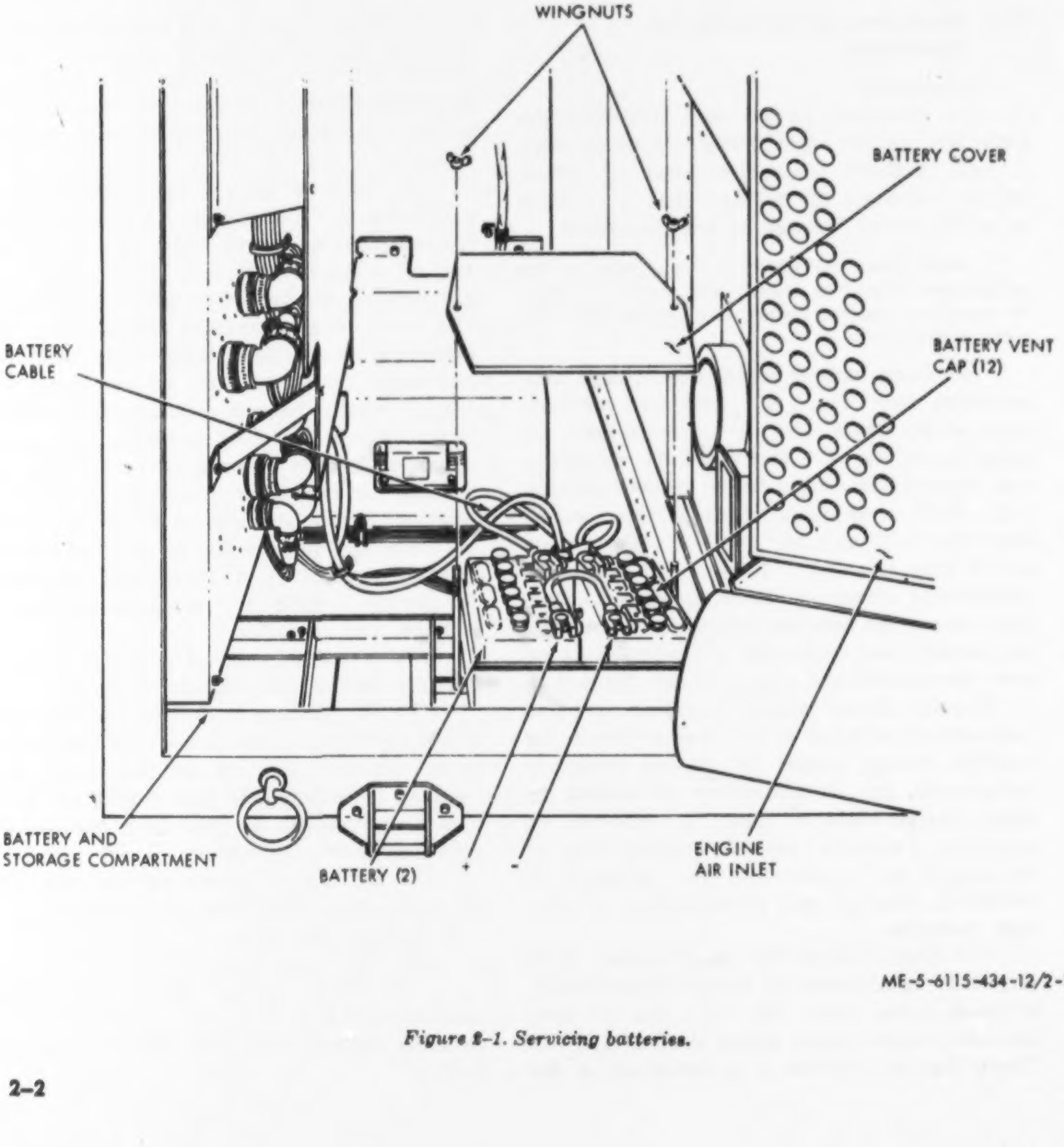
(*a*) Open battery access and storage compartment door (fig. 1-1), remove wingnuts securing battery cover and remove cover (fig. 2-1).

(*b*) Remove battery vent caps and add pure distilled water to battery cells until proper electrolyte level is reached. If batteries do not have electrolyte level markers, add distilled water until electrolyte level is 3/8 inch above cell plates.

Warning: **If battery electrolyte is spilled on skin or clothing, immediately wash with cold water or a sodium bicarbonate solution to prevent severe skin burns or damage to clothing.**

Caution: **Avoid spilling battery electrolyte on painted surfaces. Damage to painted surfaces may result.**

(*c*) Check specific gravity of electrolyte in each battery cell with a hydrometer. Refer to table 2-1 for hydrometer specific gravity


WINGNUTS
BATTERY COVER
BATTERY CABLE
BATTERY VENT CAP (12)
BATTERY AND STORAGE COMPARTMENT
BATTERY (2)
+
-
ENGINE AIR INLET

ME-5-6115-434-12/2-1

Figure 2-1. Servicing batteries.

temperature corrections. Refer to table 2-2 and establish the state of charge of batteries with specific gravity corrected to 80°F.

(*d*) Check that battery vent cap holes are open and install vent caps on batteries.

(*e*) Remove any corrosion from battery terminals or terminal lugs using a solution of sodium bicarbonate or an approved cleaning compound. Apply an approved corrosion preventive compound to battery terminals and terminal lugs.

(*f*) If batteries are disconnected, connect batteries as shown in figure 2-1, then reinstall battery cover and secure with wingnuts.

(2) *New batteries.*

(*a*) New batteries are normally shipped dry charged. Remove battery vent caps. Add electrolyte of specified specific gravity (1.285 at 69°F) to level indicated on batteries. If batteries already contain electrolyte, add pure distilled water to each cell until proper electrolyte level is reached. If batteries do not have electrolyte level markers, add distilled water to each cell until electrolyte level is 3/8 inch above cell plates. Check that vent holes in vent caps are open, then install vent caps.

***Warning:* If battery electrolyte is spilled on clothing, immediately wash with cold water or a sodium bicarbonate solution to prevent severe skin burns or damage to clothing.**

***Caution:* Avoid spilling battery electrolyte on painted surfaces. Damage to painted surfaces may result.**

(*b*) Install batteries in battery box and connect as shown in figure 2-1. Apply an approved corrosion preventive compound to terminals and terminal lugs. Install battery cover and secure with wingnuts.

Table 2-1. Hydrometer Specific Gravity Temperature Corrections

Degrees fahrenheit	Gravity corrections
+120	+0.016
+115	+0.014
+110	+0.012
+105	+0.010
+100	+0.008
+ 95	+0.006
+ 90	+0.004
+ 85	+0.002
+ 80	0
+ 75	-0.002
+ 70	-0.004
+ 65	-0.006
+ 60	-0.008
+ 55	-0.010
+ 50	-0.012
+ 45	-0.014
+ 40	-0.016
+ 35	-0.018
+ 30	-0.020
+ 25	-0.022
+ 20	-0.024
+ 15	-0.026
+ 10	-0.028
+ 5	-0.030
0	-0.032
+ 5	-0.034
- 10	-0.036
- 15	-0.038
- 20	-0.040

Table 2-2. State of Charge With Specific Gravity Corrected to 80°F

Specific gravity	State of charge, percent
1.280	100
1.250	75
1.220	50
1.190	25
1.160	Little useful capacity
1.130	Discharged

c. Fuel and Lubrication System Depreservation and Servicing.

(1) Open oil tank access door (fig. 1-1) and fill oil tank with oil as specified. (Refer to current Lubrication Order.)

(2) Connect a source of fuel to power unit fuel inlet fitting (fig. 1-2) as described in paragraph 2-3*b*(2).

(3) Remove engine combustor access panel (fig. 1-2). Disconnect fuel line from fuel atomizer and connect a line to drain outboard into a suitable container. (fig. 2-2.)

(4) Place the master switch on the instrument panel momentarily in the START position, (para 2-14) to motor the engine by starter motor action for 10 to 15 seconds and allow fuel to discharge from the outboard drain line.

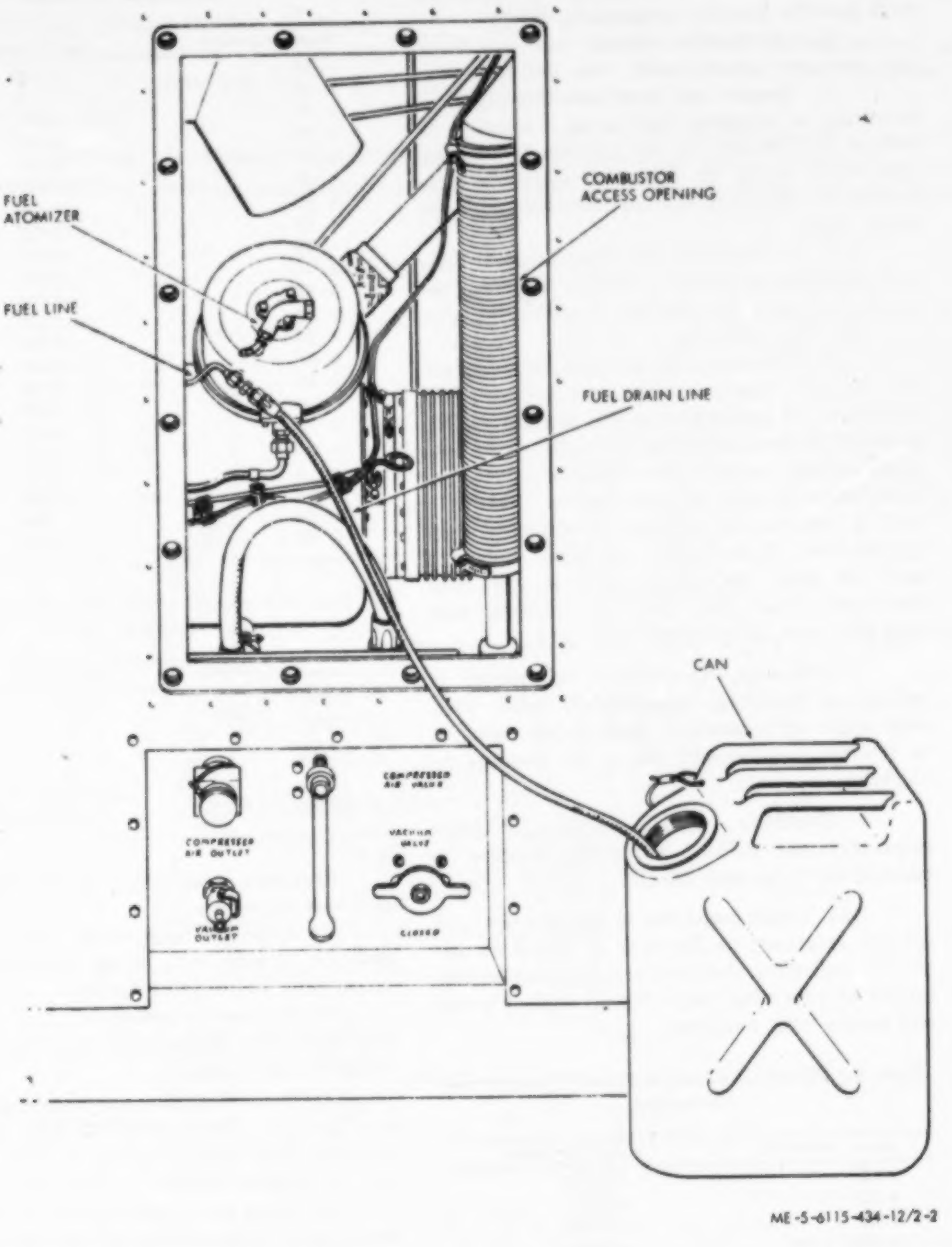

FUEL ATOMIZER
FUEL LINE
COMBUSTOR ACCESS OPENING
FUEL DRAIN LINE
CAN
COMPRESSED AIR VALVE
COMPRESSED AIR OUTLET
VACUUM VALVE
VACUUM OUTLET
CLOSED
ME-5-6115-434-12/2-2

Figure 2-2. Depreservation of fuel system.

Then place master switch to STOP position. Disconnect and remove the outboard drain line and reconnect the engine fuel line to the fuel atomizer. Install engine combustor access panel (fig. 1-2).

2-2. Installation of Separately Packed Equipment

All equipment necessary for operation of the power unit is provided installed in or stowed in the compartments of the power unit.

2-3. Installation or Setting Up Instructions

a. Location.

(1) Locate power unit as close as possible to the elements to be serviced by the power unit. Provide sufficient clear area around the unit to permit opening of all doors and panels and unobstructed airflow to the air inlets and from the exhaust openings. Provide adequate drainage of the power unit operating area.

Note. Locations where power unit may be exposed to high humidity, sand, or dust, should be avoided whenever possible. Moisture condenses on power unit parts and may cause corrosion. Sand, dust, and dirt shorten life of power unit parts and can cause mechanical failure.

(2) Position the power unit on any reasonably level surface, then adjust position to obtain as near level as possible.

Note. Do not operate power unit if front to rear axis is more than 15 degrees from level with up to 10 degrees displacement to either side.

b. Installation Connections.

Note. Perform inspection and service procedures as described in paragraph 2-1.

(1) *Ground connection.* Connect one end of a number 6 wire to electrical system ground terminal (E2) (fig. 2-3) and other end to a ground electrode, such as underground water piping system or ground rod. The ground electrode shall be 3/4 inch minimum diameter if piping system is used. If ground rod is used, it shall be driven in earth to a depth of 8 ft. minimum and shall have a 5/8 inch minimum diameter.

(2) *Fuel supply connection.* Connect external fuel system filter assembly (fig. 1-16) to fuel inlet fitting as shown in figure 2-4. Connect fuel hose assembly between fuel supply and filter assembly. Open fuel shutoff valve (fig. 2-4) and position fuel filter bypass valve to "BOTH" position. Check fuel lines and fuel filter assembly for evidence of leakage. Correct all leakage before proceeding with installation connections.

(3) *Conditioned air outlet compartment divider panel installation.* Install divider panel (fig. 1-16) and compartment drain hoses (fig. 1-16) in conditioned air outlet compartment (fig. 1-2) as follows.

(*a*) Remove divider panel from battery access and storage compartment (fig. 1-2) and remove drain hoses secured to bottom of panel.

(*b*) Carefully install panel with cutout in panel corner around heated air line insulated collar in compartment with left side of panel engaging angle slots in brace on left side of compartment (fig. 2-5). Engage slots in rear edge of panel with hook in wall of compartment. Secure panel to compartment with the three wingstuds.

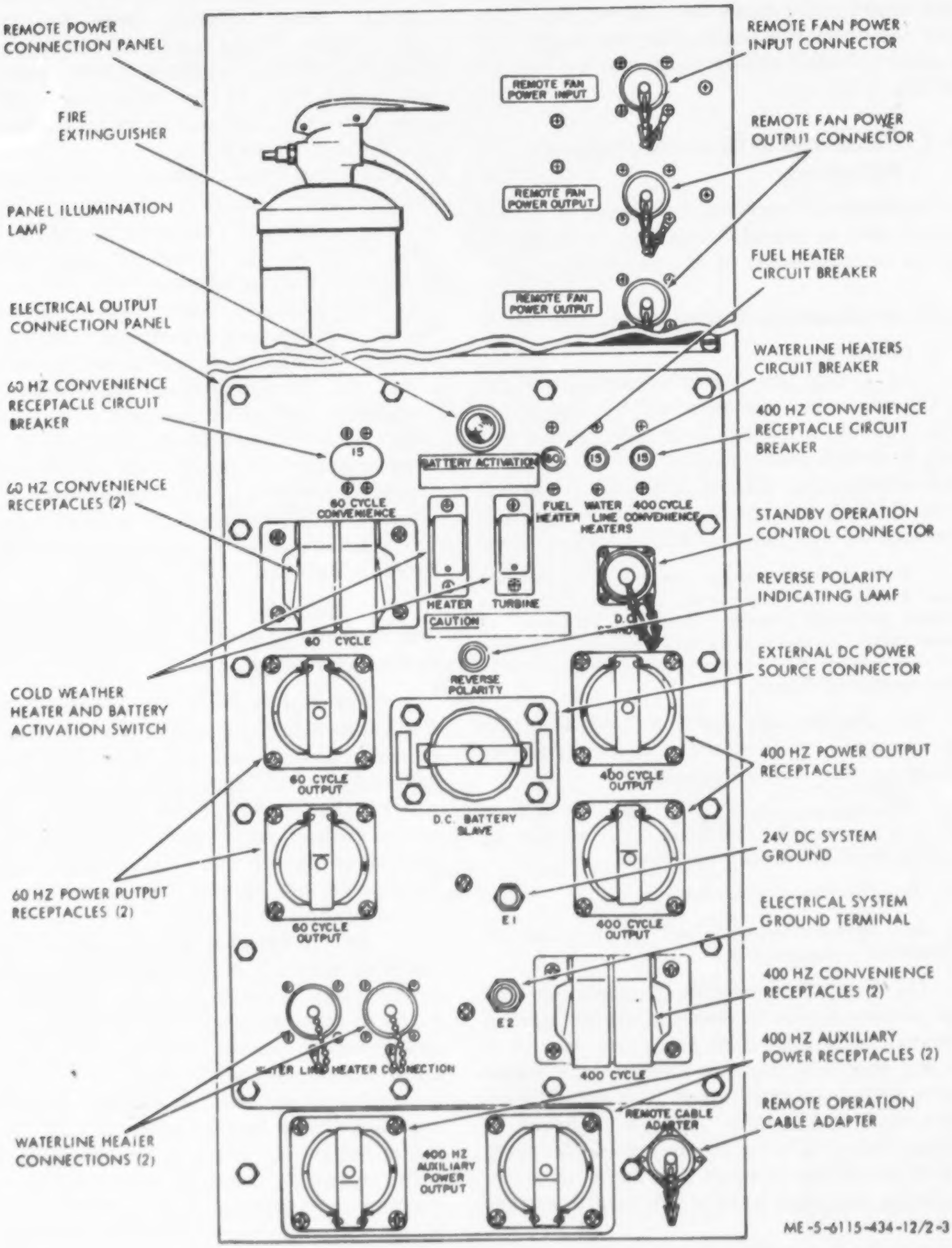
Caution: **Use care during installation of panel to prevent damage to insulating foam around edge of panel.**

(*c*) Install drain hoses (fig. 2-5) on fittings in bottom of divider panel and insulated collar around heated air line. Position hose behind heated air lines as shown in figure 2-5.

(4) *External 24v dc auxiliary power source connections.* If power unit batteries are discharged or otherwise inoperative, connect an external 24v dc auxiliary power source to the power unit as follows.

(*a*) If external 24v dc power source has a dc take off receptacle, connect external dc electrical power input cable assembly (fig. 1-16) to take off receptacle and to external dc power source connector (fig. 2-3) on electrical output connection panel.

(*b*) If an external battery or batteries are used, install battery terminal lugs of external battery dc power cable assembly (fig. 1-16) on battery terminals with polarity marks (+ and -) on terminal lugs matched to polarity marks on battery terminals. Connect dc power cable assembly to external dc power source connector (fig. 2-3) on electrical output connection panel.


REMOTE POWER CONNECTION PANEL
FIRE EXTINGUISHER
PANEL ILLUMINATION LAMP
ELECTRICAL OUTPUT CONNECTION PANEL
60 HZ CONVENIENCE RECEPTACLE CIRCUIT BREAKER
60 HZ CONVENIENCE RECEPTACLES (2)
COLD WEATHER HEATER AND BATTERY ACTIVATION SWITCH
60 HZ POWER PUTPUT RECEPTACLES (2)
WATERLINE HEATER CONNECTIONS (2)
REMOTE FAN POWER INPUT CONNECTOR
REMOTE FAN POWER OUTPUT CONNECTOR
FUEL HEATER CIRCUIT BREAKER
WATERLINE HEATERS CIRCUIT BREAKER
400 HZ CONVENIENCE RECEPTACLE CIRCUIT BREAKER
STANDBY OPERATION CONTROL CONNECTOR
REVERSE POLARITY INDICATING LAMP
EXTERNAL DC POWER SOURCE CONNECTOR
400 HZ POWER OUTPUT RECEPTACLES
24V DC SYSTEM GROUND
ELECTRICAL SYSTEM GROUND TERMINAL
400 HZ CONVENIENCE RECEPTACLES (2)
400 HZ AUXILIARY POWER RECEPTACLES (2)
REMOTE OPERATION CABLE ADAPTER
REMOTE FAN POWER INPUT
REMOTE FAN POWER OUTPUT
REMOTE FAN POWER OUTPUT
15
BATTERY ACTIVATION
FUEL HEATER
WATER LINE HEATERS
400 CYCLE CONVENIENCE
60 CYCLE CONVENIENCE
60 CYCLE
HEATER
TURBINE
CAUTION
D.C. STANDBY
REVERSE POLARITY
60 CYCLE OUTPUT
D.C. BATTERY SLAVE
400 CYCLE OUTPUT
60 CYCLE OUTPUT
E1
400 CYCLE OUTPUT
E2
WATER LINE HEATER CONNECTION
400 CYCLE
REMOTE CABLE ADAPTER
400 HZ AUXILIARY POWER OUTPUT

ME-5-6115-434-12/2-3

Figure 2-3. Electrical output connection panel and remote power connection panel.

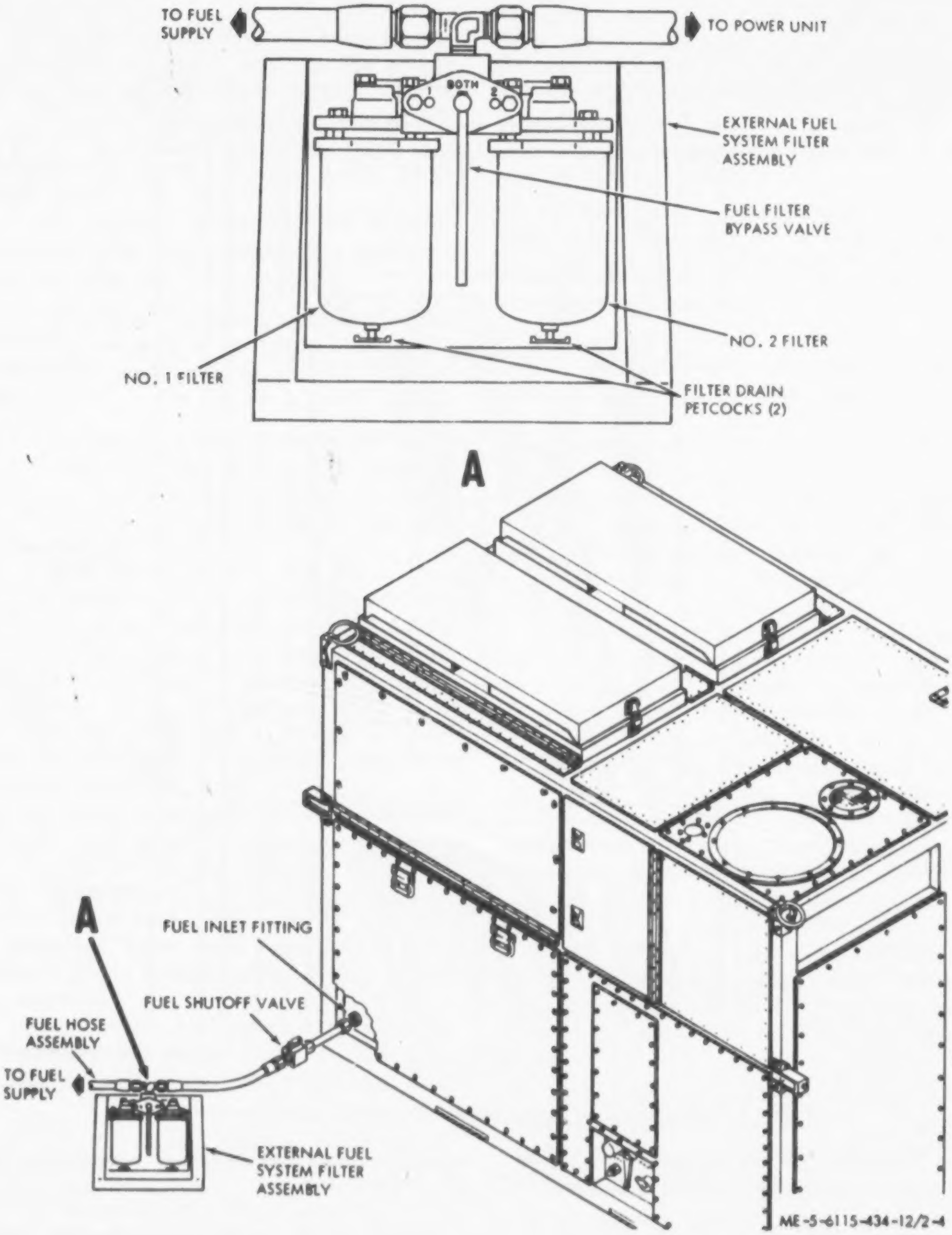

TO FUEL SUPPLY
TO POWER UNIT
BOTH
1
2
EXTERNAL FUEL SYSTEM FILTER ASSEMBLY
FUEL FILTER BYPASS VALVE
NO. 2 FILTER
NO. 1 FILTER
FILTER DRAIN PETCOCKS (2)
A
A
FUEL INLET FITTING
FUEL SHUTOFF VALVE
FUEL HOSE ASSEMBLY
TO FUEL SUPPLY
EXTERNAL FUEL SYSTEM FILTER ASSEMBLY
ME-5-6115-434-12/2-4

Figure 2–4. Fuel supply connections to power unit.

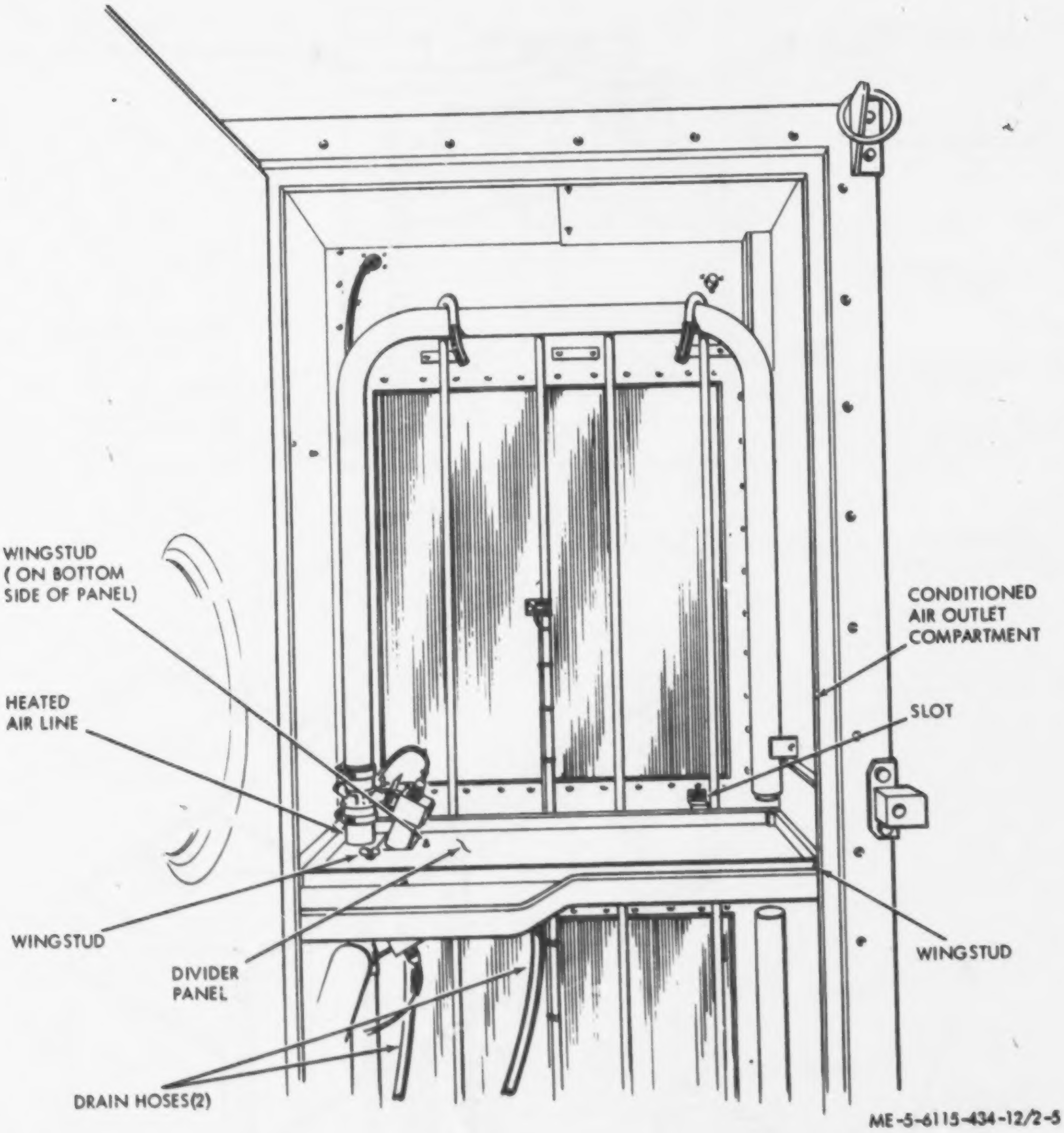

WINGSTUD
(ON BOTTOM
SIDE OF PANEL)
HEATED
AIR LINE
WINGSTUD
DIVIDER
PANEL
DRAIN HOSES(2)
CONDITIONED
AIR OUTLET
COMPARTMENT
SLOT
WINGSTUD
ME-5-6115-434-12/2-5

Figure 2-5. Conditioned air outlet compartment divider panel installation.

Caution: **Do not attempt to operate power unit if batteries are not connected.**

Note. If polarity is reversed between external battery and power unit, the reverse polarity indicating lamp will illuminate indicating the condition and the power unit will not start. Reverse cable assembly terminal lugs on battery terminals to correct the condition.

(*c*) After power unit is started (para 2-14), disconnect external dc power cable assembly.

(5) *Water system connections and priming.* Connect and prime water system as follows (fig. 2-6).

(*a*) Remove caps from all drain fittings (fig. 2-6) and allow any water in the system to drain, then reinstall caps on drain fittings.

(*b*) Open air temperature control access door (fig. 1-1) and open hot water tank vent valve (fig. 1-12) on top of hot water storage tank.

(*c*) Connect a source of water to water inlet fitting (fig. 2-6) using supply and drain water hose assembly (fig. 1-16).

Caution: **Be sure supply and drain water hose assembly is not kinked, collapsed, or otherwise positioned to restrict flow of water.**

(*d*) Connect a water hose to cold water outlet fitting (fig. 2-6) and arrange hose to drain to a convenient place. Place hot water valve (fig. 2-6) and cold water valve (fig. 2-6) in OFF position.

(*e*) Start gas turbine engine and place 400 Hz system main contactor switch in CLOSED position. Refer to paragraph 2-16*b*.

(*f*) Place hot water pump and cold water pump switches on instrument panel in ON position. Refer to paragraph 2-16*g*.

(*g*) Place cold water valve (fig. 2-6) in ON position and observe water flow from hose attached to cold water outlet fitting. Observe hot water priming vent (fig. 2-6) for continuous flow of water. When a continuous flow of water is observed from cold water outlet and hot water tank priming vent (fig. 2-6), close hot water tank vent valve (fig. 1-12) and place cold water valve (fig. 2-6) in OFF position. The hot and cold water system is now fully primed.

(*h*) Connect dual water hose assembly (fig. 1-16) to hot water outlet fitting (fig. 2-6) and to cold water outlet fitting (fig. 2-6).

Note. If possible freezing conditions are anticipated, connect electrical connectors on supply and drain water hose assembly (fig. 1-16) and dual water hose assembly (fig. 1-16) to water line heater connectors (fig. 2-3) on electrical output connection panel. Position and protect supply and drain and dual water hose assemblies to prevent kinks, collapse, and damage from traffic.

(*i*) Place hot water valve (fig. 2-6) and cold water valve (fig. 2-6) in OPEN position and observe that clean water flows freely from end of dual water hose assembly. Place hot and cold water valves in OFF position and connect dual water hose assembly to point of water use. Place hot and cold water valve in ON position. Hot and cold water delivery may now be taken at point of use.

Note. Check all outlet valves at point of water use to insure they are closed before opening valves on power unit. Approximately 15 minutes should elapse before attempting hot water use to permit water to be heated.

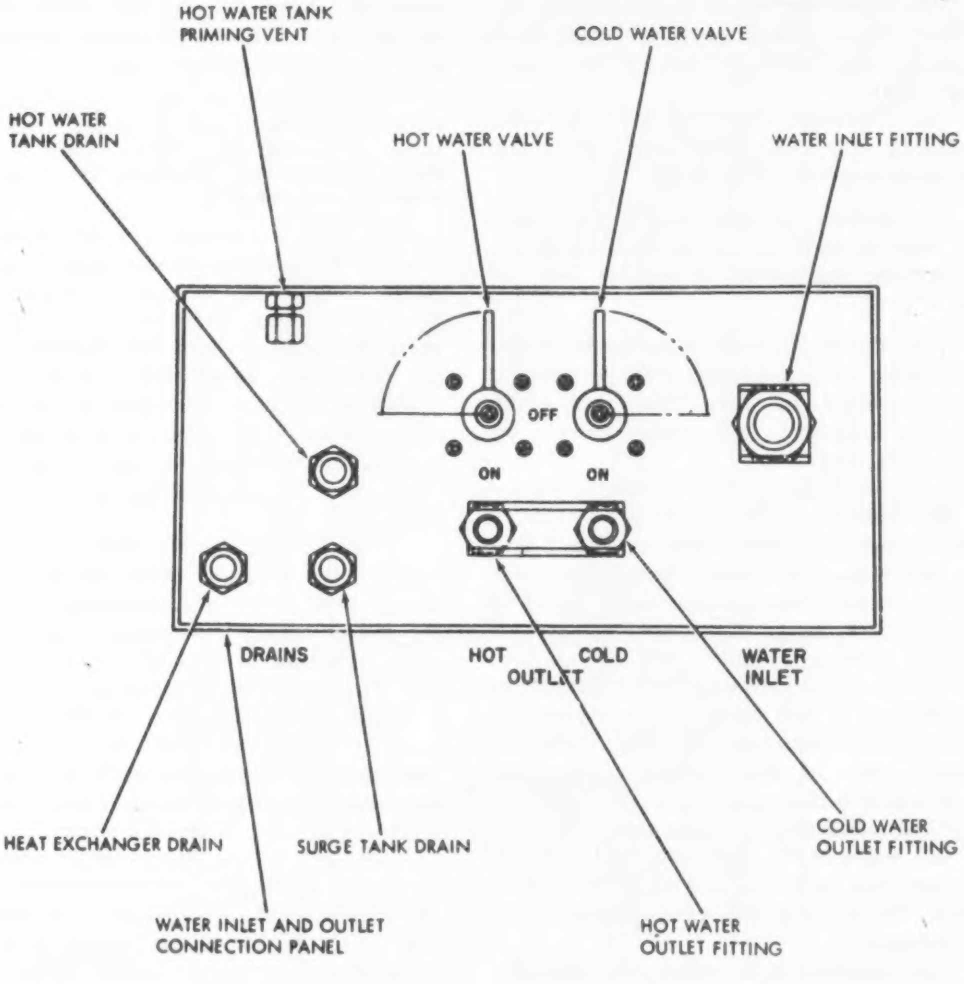
(6) *60 Hz power output connections.* Use 60 Hz electrical power output cable assembly (fig. 1-16) to connect between the 60 Hz power output receptacle (fig. 2-3) and other elements of the MUST hospital. Two 60 Hz convenience receptacles (fig. 2-3) are included on the electrical output connection panel to provide 60 Hz power for external requirements. The convenience receptacles will accommodate a standard three-prong, twist-lock plug.

(7) *400 Hz power output connections.* Use 400 Hz electrical power output cable assembly (fig. 1-16) to connect between the 400 Hz power output receptacle (fig. 2-3) and other elements of the MUST hospital. Two 400 Hz convenience receptacles (fig. 2-3) are included on the electrical output connection panel to provide 400 Hz power for external requirements. The convenience receptacles accommodate standard three-prong, twist-lock plugs or parallel U-ground plugs.

(8) *400 Hz auxiliary power connections.* If 400 Hz auxiliary power is required, connect 400 Hz electrical power output cable assemblies (fig. 1-16) to 400 Hz auxiliary power receptacles (fig. 2-3) and to 400 Hz power requirement.

Caution: **Do not use auxiliary power outlets if power unit conditioned air system is in operation or is to be operated, as an overload condition could result.**

(9) *Remote fan operation connections.* If the recirculating fans in a nonoperating power unit are to be operated, connect 400 Hz remote power cable assembly (fig. 1-16) to re-


HOT WATER TANK PRIMING VENT
COLD WATER VALVE
HOT WATER TANK DRAIN
HOT WATER VALVE
WATER INLET FITTING
OFF
ON
ON
DRAINS
HOT
COLD
OUTLET
WATER INLET
HEAT EXCHANGER DRAIN
SURGE TANK DRAIN
COLD WATER OUTLET FITTING
WATER INLET AND OUTLET CONNECTION PANEL
HOT WATER OUTLET FITTING

ME-5-6115-434-12/2-6

Figure 2-6. Water inlet and outlet connection panel.

mote fan power output connector (fig. 2-3) and to remote fan power input connector (fig. 2-3) on the non-operating unit. The remote operation cable adapter (fig. 2-3) may be used to join two 400 Hz remote power cable assemblies together to obtain additional length. Recirculating fans in two non-operating units may be powered from the operating unit provided the cooled air system in the operating unit is not operating.

(10) *Standby operation connections.* If the power unit is to be used as a standby unit or is to be connected to another power unit that will function as a standby, connect dc electrical power standby cable assembly between the standby operation control connector (fig. 2-3) on both the operating unit and the standby unit. Refer to paragraph 2-16*j*.

(11) *Conditioned air system connections.* Remove duct retaining assemblies from collapsed conditioned air duct assemblies, extend duct assemblies and inspect for abrasions, holes, or other damage. Connect duct assemblies as follows.

Caution: **Handle duct assemblies with care to avoid damage to fabric.**

(*a*) Remove covers from return air inlets (fig. 1-1). Connect conditioned air duct assemblies (fig. 1-16) to return air inlets using clamps provided with duct assembly. Connect other end of duct to return air outlet of element. Use conditioned air duct coupling assemblies (fig. 1-16), as required, to connect two or more duct assemblies for additional length.

(*b*) Remove covers from conditioned air outlets (fig. 1-2). Connect conditioned air duct assemblies (fig. 1-16) to conditioned air outlets using clamps provided with duct assembly. Connect other end of duct to conditioned air inlet of other elements of the MUST hospital. Use conditioned air duct coupling assemblies (fig. 1-16), as required, to connect two or more duct assemblies for additional length.

Caution: **Make sure return air and air out duct assemblies are connected to the corresponding inlets and outlets on the power unit to insure that each element serviced is connected with conditioned air and return air going through the same system.**

Note. Condenser air inlet panels (fig. 1-1 and 1-2) and condenser air outlet doors (fig. 1-1 and 1-2) shall be opened before operation of the cooled air system.

(12) *Compressed air system connections.* Connect compressed air hose assembly (fig. 1-16) to compressed air outlet fitting (fig. 2-7). Install junction box and valve manifold assembly (fig. 1-16) and inflation and deflation ejector assembly (fig. 1-16) to the inflation manifold on the inflatable element of the MUST hospital. Connect delivery end of compressed air hose assembly to ejector assembly for inflation or deflation of the element.

(13) *Vacuum system connection.* Connect vacuum hose assembly (fig. 1-16) to vacuum outlet fitting (fig. 2-7). Connect other end of vacuum hose assembly to element requiring vacuum service.

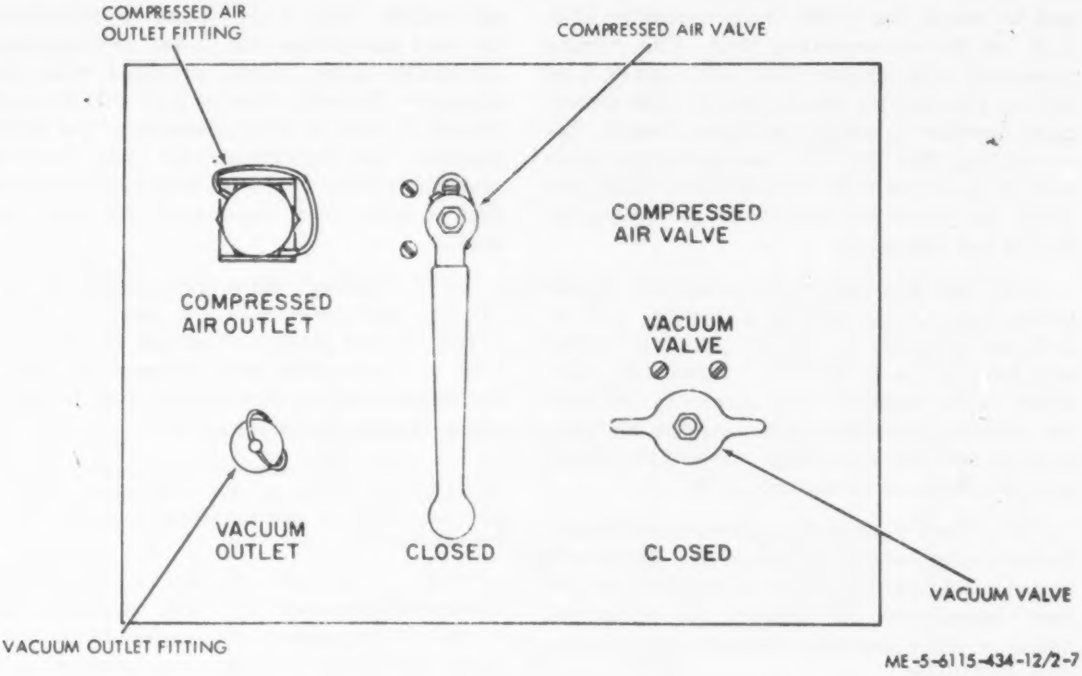

COMPRESSED AIR OUTLET FITTING
COMPRESSED AIR VALVE
COMPRESSED AIR VALVE
COMPRESSED AIR OUTLET
VACUUM VALVE
VACUUM OUTLET
CLOSED
CLOSED
VACUUM VALVE
VACUUM OUTLET FITTING
ME-5-6115-434-12/2-7

Figure 2-7. Compressed air and vacuum connection and control panel.

Section II. MOVEMENT TO A NEW WORKSITE

2-4. Dismantling for Movement

a. Disconnection of Accessory Components.

(1) Disconnect all electrical cable assemblies (fig. 1-16) from receptacles on electrical output connection panel and remote power connection panel (fig. 2-3) and from other elements of the MUST hospital. Coil cable assemblies and secure ends for stowage. Remove ground wire from electrical system ground terminal (fig. 2-3). Close or install all protective covers on receptacles of electrical output connection panel and remote power connection panel (fig. 2-3).

(2) Disconnect all conditioned air duct assemblies from return air inlets (fig. 1-1) and conditioned air outlets (fig. 1-2). Install covers over air inlets and outlets and secure covers with clamps. Visually inspect duct assemblies for abrasions, holes, or other damage. Separate conditioned air duct assemblies (fig. 1-16) from conditioned air duct coupling assemblies (fig. 1-16), collapse duct assemblies, and secure in the collapsed position with duct retaining assemblies.

Caution: **Handle conditioned air duct assemblies with care to avoid damage to fabric.**

(3) Close hot and cold water valves (fig. 2-6). Disconnect dual water hose assembly (fig. 1-16) and supply and drain water hose assembly (fig. 1-16) from water inlet and outlet connection panel (fig. 1-1) and from water supply and discharge points. Drain hose assemblies. Coil hose assemblies and secure ends for stowage. Drain power unit water system as follows.

(*a*) Remove drain caps from hot water tank drain (fig. 2-6), heat exchanger drain (fig. 2-6), and surge tank drain (fig. 2-6). Open hot and cold water valves (fig. 2-6), hot water tank vent valve (fig. 1-12), and surge tank vent valve until all water has drained from the system, then close vent valves.

(*b*) Connect compressed air hose assembly (fig. 1-16) to compressed air outlet fitting (fig. 2-7). Hold discharge end of air hose assembly against cold water outlet fitting (fig. 2-6). Start engine (para 2-14) and open compressed air valve (fig. 2-7) approximately 20 to 30 degrees to deliver a small flow of compressed air into water system to purge residual waters.

Caution: **Observe water system tank and plumbing for excessive heating due to purge air. If external temperature of water system components approaches safe touch temperature (160°F maximum), decrease compressed air flow, or shut off air flow completely until system cools. Excessive temperatures will damage the pump and valve seals.**

(*c*) When all water has been purged, note which water connection is discharging maximum amount of air, then close that connection. Continue to close connections discharging maximum amount of air until only one connection remains open, then shut off compressed air, remove air hose assembly from cold water outlet fitting (fig. 2-6), and close remaining connection and cold water outlet valve (fig. 2-6). Shut down engine (para 2-15). Disconnect compressed air hose assembly from compressed air outlet fitting, coil hose assembly, and secure ends for stowage.

(4) Close vacuum control valve (fig. 2-7). Disconnect vacuum hose assembly (fig. 1-16) from vacuum outlet fitting, coil hose assembly, and secure ends for stowage. Install protective caps on vacuum outlet fitting and compressed air outlet fitting.

(5) Disconnect fuel hose assemblies (fig. 1-16) from fuel supply and from filter assembly (fig. 2-4). Drain hose assemblies, coil, and secure ends for stowage. Open filter drain petcocks (fig. 2-4) on filter cases and allow fuel to drain from filter assemblies. Disconnect filter assembly and fuel hose assembly from power unit fuel inlet fitting (fig. 2-4) and allow fuel to drain from hose and inlet fitting. Install protective cap on power unit fuel inlet fitting.

(6) Close and secure both condenser air inlet panels (fig. 1-1), condenser air outlet doors (fig. 1-1 and 1-2), and vent air doors (fig. 1-1).

(7) Remove three windstuds (fig. 2-5) and carefully remove divider panel from conditioned air outlet compartment. Remove drain hoses (fig. 2-5) from panel and secure hoses to bottom of panel with adhesive tape for storage.

Caution: **Use care during removal of panel to prevent damage to insulating foam around edge of panel.**

(8) Remove wingnuts (fig. 2-1) securing battery cover and remove cover. Disconnect battery cable lugs from battery terminals. Reinstall battery cover and secure with wingnuts.

b. Stowage of Accessory Components.

(1) Stow remote temperature sensing cable assembly, dual water hose assembly, three conditioned air duct assemblies, and two conditioned air duct coupling assemblies in conditioned air outlet compartment (fig. 1-2) as shown in figure 2-8. Secure stacked duct assemblies with strap.

(2) Stow external fuel system filter assembly, 400 Hz electrical power cable assembly, 60 Hz electrical power cable assembly, three fuel hose assemblies, supply and drain water hose assembly, and 400 Hz remote power cable assembly in refrigeration compressors compartment (fig. 1-2) as shown in figure 2-9.

(3) Stow spare filter elements, two conditioned air duct assemblies, and one conditioned air duct coupling assembly in condenser compartment (no. 1 system) (fig. 1-1) as shown in figure 2-10. Secure duct assemblies with positioning hooks to prevent movement during transport.

(4) Stow two conditioned air duct assemblies and one conditioned air duct coupling assembly in condenser compartment (no. 2 system) (fig. 1-1) as shown in figure 2-11. Secure duct assemblies with positioning hooks to prevent movement during transport.

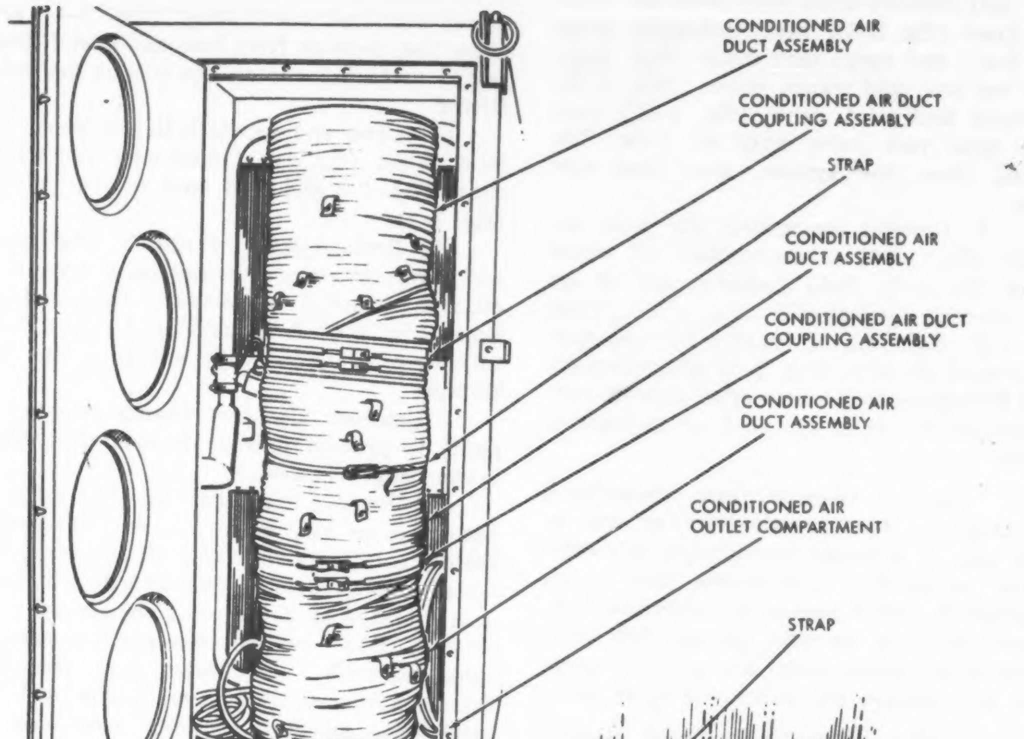
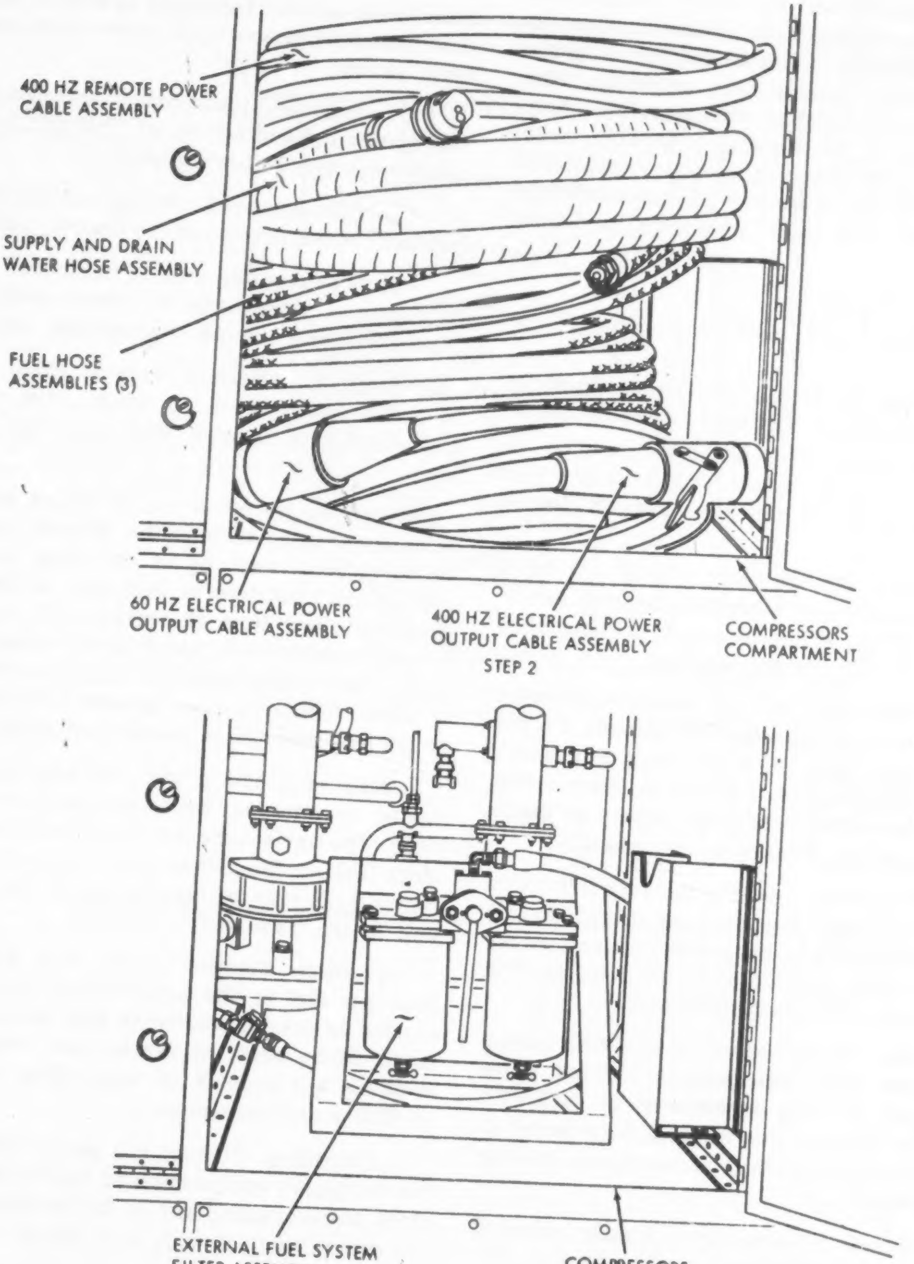

CONDITIONED AIR DUCT ASSEMBLY
CONDITIONED AIR DUCT COUPLING ASSEMBLY
STRAP
CONDITIONED AIR DUCT ASSEMBLY
CONDITIONED AIR DUCT COUPLING ASSEMBLY
CONDITIONED AIR DUCT ASSEMBLY
CONDITIONED AIR OUTLET COMPARTMENT
STEP 2
STRAP
AIR DUCT ADAPTER ASSEMBLY (2)
CONDITIONED AIR OUTLET COMPARTMENT
DUAL WATER HOSE ASSEMBLY
REMOTE TEMPERATURE SENSING CABLE ASSEMBLY
STEP 1
ME-5-6115-434-12/2-8

Figure 2–8. Stowing accessory components in conditioned air outlet compartment.


400 HZ REMOTE POWER CABLE ASSEMBLY
SUPPLY AND DRAIN WATER HOSE ASSEMBLY
FUEL HOSE ASSEMBLIES (3)
60 HZ ELECTRICAL POWER OUTPUT CABLE ASSEMBLY
400 HZ ELECTRICAL POWER OUTPUT CABLE ASSEMBLY
COMPRESSORS COMPARTMENT
STEP 2
EXTERNAL FUEL SYSTEM FILTER ASSEMBLY
COMPRESSORS COMPARTMENT
STEP I

ME-5-6115-434-12/2-9

Figure 2-9. Stowing accessory components in refrigeration compressors compartment.

(5) Stow inflation and deflation ejector assembly, conditioned air outlet compartment divider panel, external dc electrical power input cable assembly, external battery dc power cable assembly, vacuum hose assembly, electrical dc power standby cable assembly, junction box and valve manifold assembly, compressed air hose assembly, and one conditioned air duct assembly in battery access and storage compartment (fig. 1-1) as shown in figure 2-12.

c. Final Procedures.

(1) Close and secure all panels and doors.

(2) Close or install protective covers or caps on connection fittings and receptacles.

(3) If power unit is to be handled or loaded by hoisting, install Sling on hoist rings at corners of power unit as shown in figure 2-13.

d. Hoisting. Attach Sling (fig. 2-13) to a crane, helicopter, or other hoisting device capable of lifting a minimum of 5000 pounds and hoist to the desired location.

Warning: **Do not use lifting equipment with capacity of less than 5000 pounds. Do not allow power unit to swing back and forth when it is suspended. Failure to observe this warning may result in severe injury or death to personnel or damage to equipment.**

e. Fork Lifting. Position the fork lift (5000 pound minimum capacity) at the fork lift points designated on the power unit and shown in figure 2-13 and lift power unit for loading or transport over short distances.

Warning: **Do not use fork lift with capacity of less than 5000 pounds. Do not allow power unit to rock excessively on fork lift. Failure to observe this warning may result in severe injury or death to personnel or damage to equipment.**

f. Wheeled Transporter. Attach wheeled transporter or mobilizer to power unit as follows.

(1) Separate transporter sections and prepare transporter for use observing recommendations of transporter manufacturer.

(2) Position transporter sections at ends of power unit adjacent to wheeled transporter attachment points (fig. 2-13) at ends of power unit. Connect transporter to power unit attachment points.

(3) Operate transporter according to transporter manufacturer's instruction to raise power unit to towing height.

(4) Use approved towing equipment or manually move power unit to desired position.

(5) When power unit is in desired position, operate transporter to lower container. Disconnect and remove transporter sections.

g. Skidding. Attach a cable or chain sling to skidding and tie down rings (fig. 2-13) and connect to suitable equipment for skidding to desired location.

Caution: **Do not attach skidding sling to skidding equipment in such a manner that the angle between any leg of the sling and the end of the container is less than 45 degrees. Any angle less than 45 degrees will cause an excessive side strain which could damage the power unit. Limit skidding of the power unit to short distances over smooth level terrain to prevent damage to power unit skids.**

h. Shipment. The power unit may be transported by airplane, helicopter, ship, truck, or train. The various tie down and hoisting rings identified on the power unit and shown in figure 2-13 may be used to secure the power unit to the transport equipment.

Caution: **Position power unit with skid base parallel to the longitudinal axis of the carrier to prevent excessive side loads on the skids. Make sure the carrier and restraining methods are capable of supporting a weight of 5000 pounds minimum.**

i. Unloading. Unload the power unit from the transport equipment and locate in the desired position using any of the handling methods described in *d, e, f,* or *g* above.

2-5. Reinstallation After Movement

Refer to paragraphs 2-1, 2-2, and 2-8 for installation procedures.

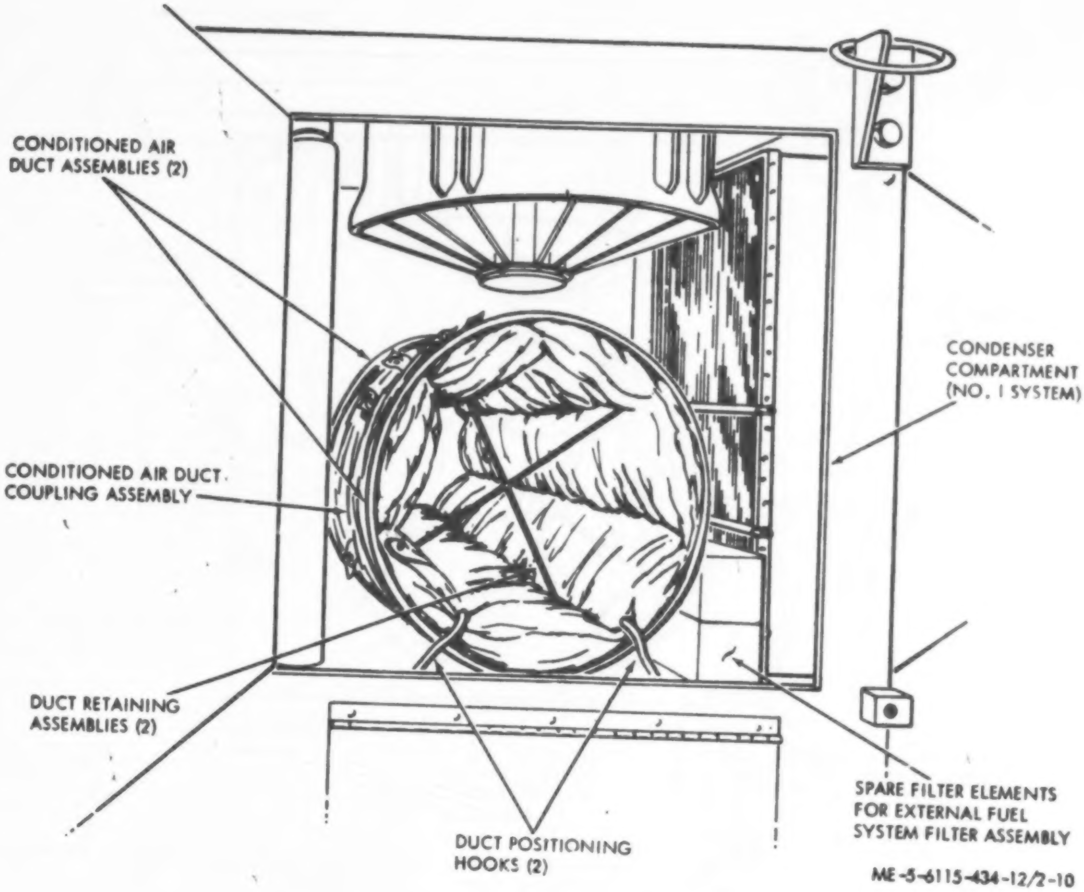

CONDITIONED AIR DUCT ASSEMBLIES (2)
CONDENSER COMPARTMENT (NO. 1 SYSTEM)
CONDITIONED AIR DUCT COUPLING ASSEMBLY
DUCT RETAINING ASSEMBLIES (2)
SPARE FILTER ELEMENTS FOR EXTERNAL FUEL SYSTEM FILTER ASSEMBLY
DUCT POSITIONING HOOKS (2)
ME-5-6115-434-12/2-10

Figure 2-10. Stowing accessory components in condenser compartment (no. 1 system).

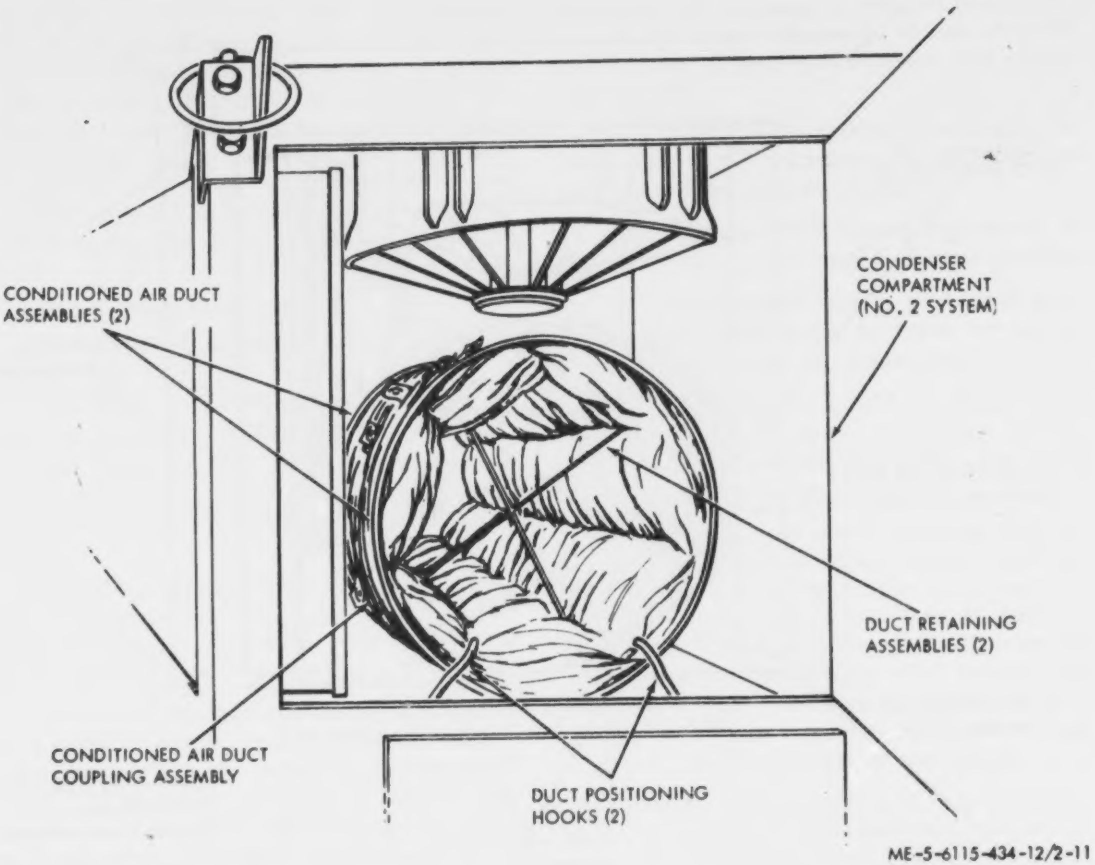

CONDITIONED AIR DUCT ASSEMBLIES (2)
CONDENSER COMPARTMENT (NO. 2 SYSTEM)
DUCT RETAINING ASSEMBLIES (2)
CONDITIONED AIR DUCT COUPLING ASSEMBLY
DUCT POSITIONING HOOKS (2)
ME-5-6115-434-12/2-11

Figure 2-11. Stowing accessory components in condenser compartment (no. 2 system).

best copy available

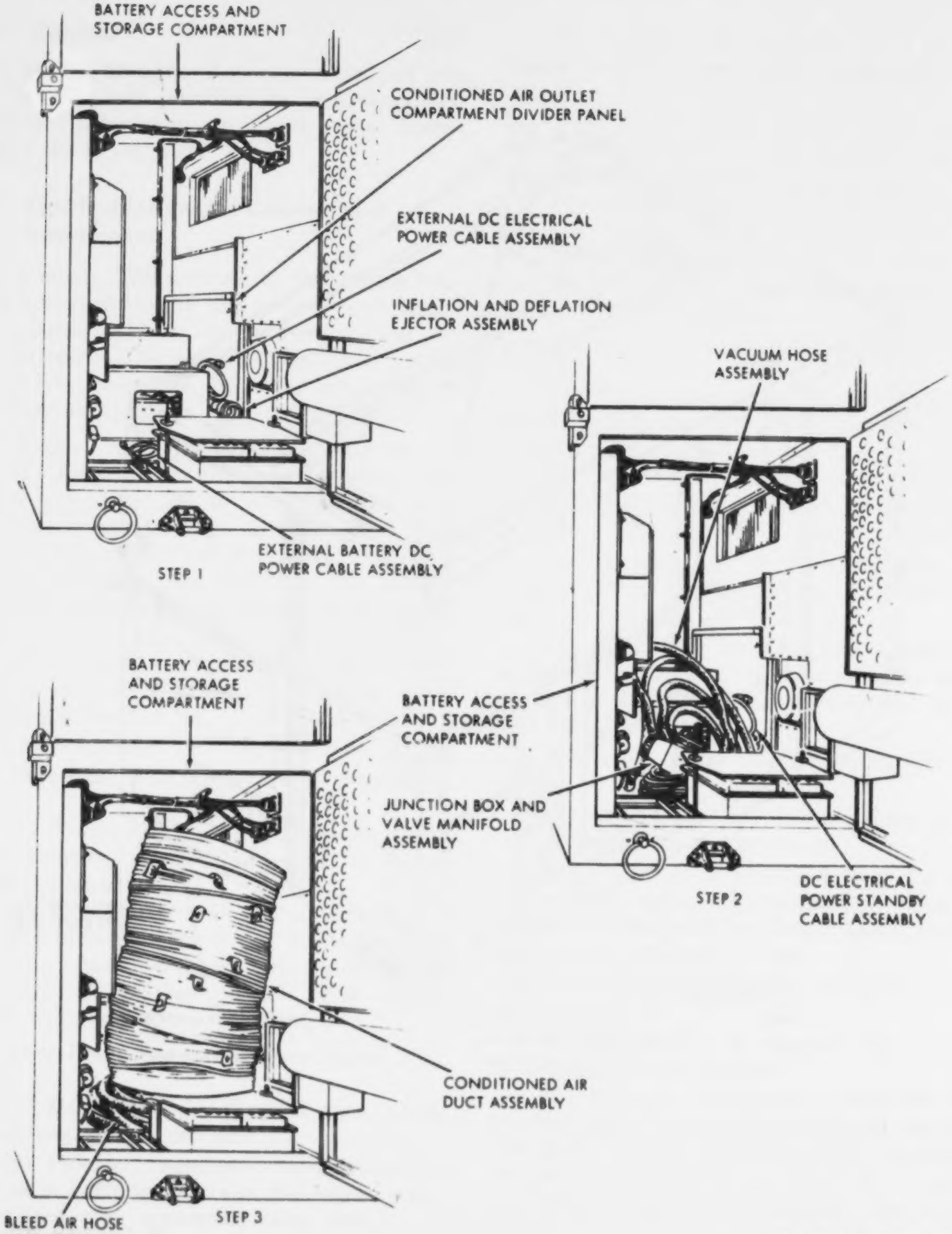

BATTERY ACCESS AND STORAGE COMPARTMENT
CONDITIONED AIR OUTLET COMPARTMENT DIVIDER PANEL
EXTERNAL DC ELECTRICAL POWER CABLE ASSEMBLY
INFLATION AND DEFLATION EJECTOR ASSEMBLY
EXTERNAL BATTERY DC POWER CABLE ASSEMBLY
STEP 1
VACUUM HOSE ASSEMBLY
BATTERY ACCESS AND STORAGE COMPARTMENT
JUNCTION BOX AND VALVE MANIFOLD ASSEMBLY
STEP 2
DC ELECTRICAL POWER STANDBY CABLE ASSEMBLY
BATTERY ACCESS AND STORAGE COMPARTMENT
CONDITIONED AIR DUCT ASSEMBLY
BLEED AIR HOSE ASSEMBLY
STEP 3
ME-5-6115-434-12/2-12

Figure 2-12. Stowing accessory components in battery access and storage compartment.

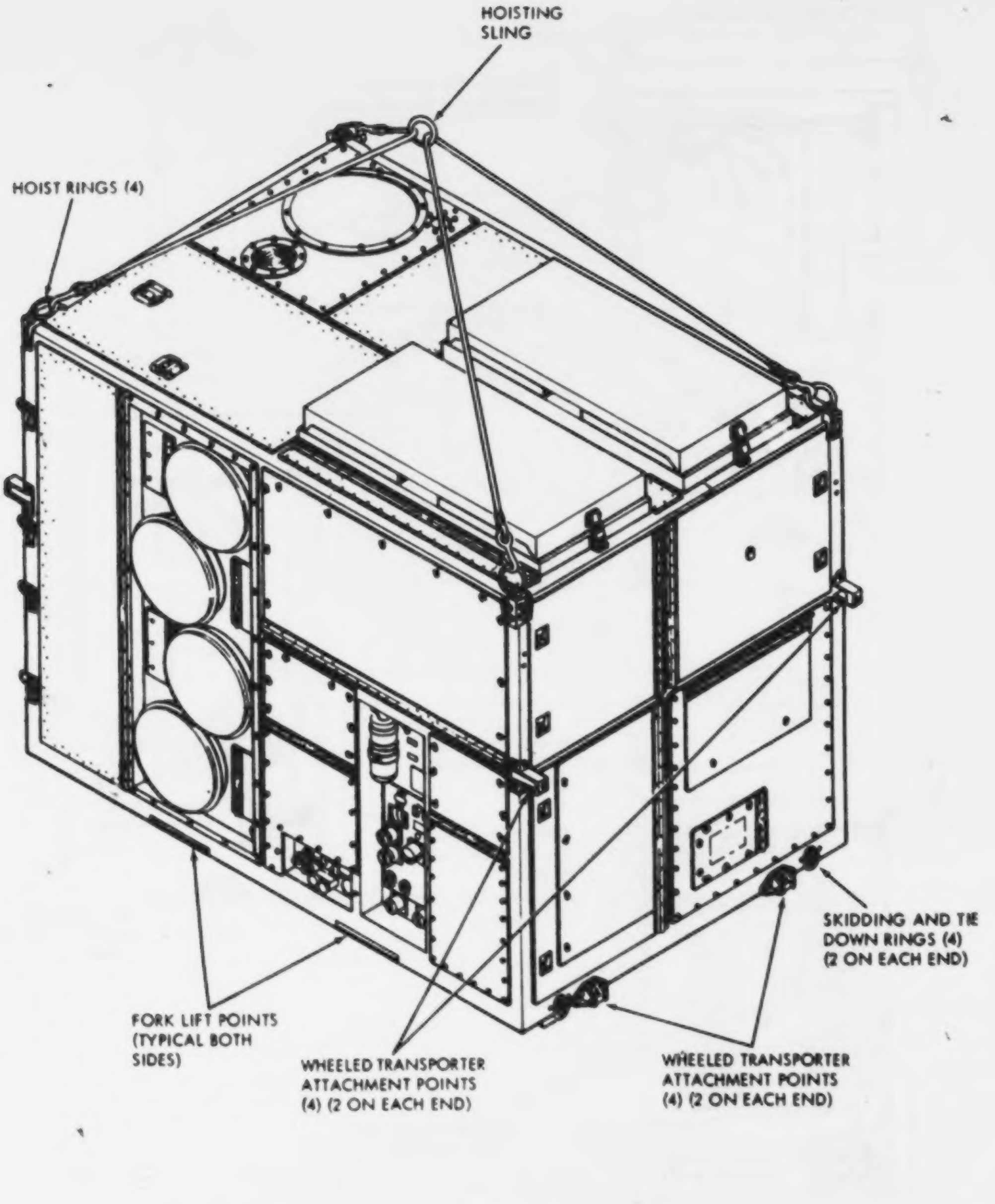

HOISTING SLING
HOIST RINGS (4)
SKIDDING AND TIE DOWN RINGS (4) (2 ON EACH END)
FORK LIFT POINTS (TYPICAL BOTH SIDES)
WHEELED TRANSPORTER ATTACHMENT POINTS (4) (2 ON EACH END)
WHEELED TRANSPORTER ATTACHMENT POINTS (4) (2 ON EACH END)
ME-5-6115-434-12/2-13

Figure 2-13. Power unit handling and transport attachment points.

Section III. CONTROLS AND INSTRUMENTS

2-6. General

This section describes the various controls and instruments and provides the operator/crew sufficient information to insure proper operation of the power unit.

2-7. Gas Turbine Engine Controls and Instruments

a. General. The purpose of the engine controls and instruments and normal and maximum indications of the instruments are described below. The engine controls and instruments are grouped in the lower left corner of the instrument panel. (See fig. 2-14.)

b. Battery Charging Ammeter (fig. 2-14).

(1) *Description.* Dial pointer gage, calibrated to indicate -30 to +30 amperes in 1 ampere increments. Scale is colored red from -30 to 0 and green from 0 to +30.

(2) *Purpose.* To indicate the battery charging current during operation of power unit.

(3) *Indication.* Battery charging current of about +11 amps after initial engine start, charging current of +2 to +5 amps after a short period of power unit operation.

c. Fuel Line Heater Circuit Breaker (fig. 2-14).

(1) *Description.* A press-to-reset circuit breaker button installed in the fuel line heater circuit.

(2) *Purpose.* Provide short circuit and overload protection for a fuel line heater circuit. The circuit breaker opening amperage (15 amps) is marked on the reset button. (Used with winterized units only.)

d. Fuel Line Heater Indicator Lamp (fig. 2-14).

(1) *Description.* A filament type press-to-test lamp with a red lens.

(2) *Purpose.* Illuminates to indicate that the fuel is sufficiently warm for engine starting. (Used with winterized units only.)

e. Fuel Heater Switch (fig. 2-14).

(1) *Description.* A three position toggle switch.

(2) *Purpose.* To energize a fuel line heater circuit. (Used with winterized units only.)

f. Fuel Boost Pump Switch (fig. 2-14).

(1) *Description.* A two position solenoid-held, on-off toggle switch.

(2) *Purpose.* Energizes the fuel boost pump to deliver fuel to the engine fuel control unit at a constant pressure (15 psig). Will trip to OFF position when master switch is in RUN or START position.

g. Exhaust Gas Temperature Indicator (fig. 2-14).

(1) *Description.* Dial pointer gage, calibrated to indicate 0° to 1800°F in 100° increments to 900°F, 50° increments from 900°F to 1500°F, and 100° increments from 1500°F to 1800°F. The scale is colored green from 0° to 1225°F and red from 1225°F to 1800°F.

(2) *Purpose.* To indicate exhaust gas temperature in the engine exhaust pipe during operation.

(3) *Indication.* Exhaust gas temperature shall not exceed 1260°F during engine acceleration or 1225°F during steady-state operation at full load.

h. Ready to Load Indicator Lamp (fig. 2-14).

(1) *Description.* A filament type press-to-test lamp with a green lens.

(2) *Purpose.* Illuminates to indicate that gas turbine engine has accelerated to approximately 95 percent of governed speed and is ready for application of load.

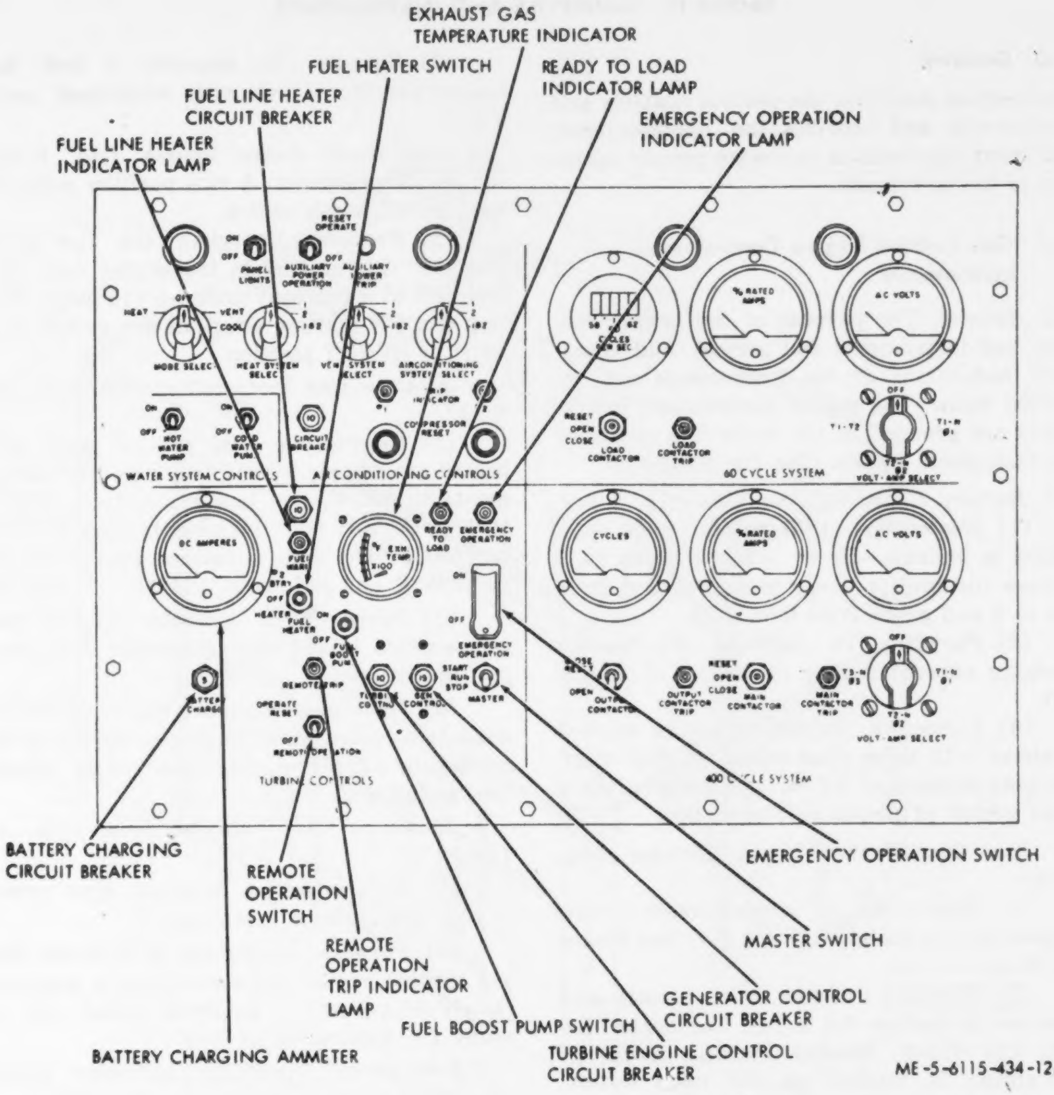
i. Emergency Operation Indicator Lamp (fig. 2-14).

(1) *Description.* A filament type press-to-test lamp with a red lens.

(2) *Purpose.* Illuminates to indicate that the emergency operation switch is on and that the power unit is operating with protective devices bypassed.

j. Emergency Operation Switch (fig. 2-14).

(1) *Description.* A two position on-off toggle switch. A red lockout guard is installed over the switch to prevent accidental actuation of the switch.


EXHAUST GAS TEMPERATURE INDICATOR
FUEL HEATER SWITCH
READY TO LOAD INDICATOR LAMP
FUEL LINE HEATER CIRCUIT BREAKER
EMERGENCY OPERATION INDICATOR LAMP
FUEL LINE HEATER INDICATOR LAMP
WATER SYSTEM CONTROLS
AIR CONDITIONING CONTROLS
60 CYCLE SYSTEM
400 CYCLE SYSTEM
TURBINE CONTROLS
BATTERY CHARGING CIRCUIT BREAKER
REMOTE OPERATION SWITCH
REMOTE OPERATION TRIP INDICATOR LAMP
BATTERY CHARGING AMMETER
FUEL BOOST PUMP SWITCH
TURBINE ENGINE CONTROL CIRCUIT BREAKER
GENERATOR CONTROL CIRCUIT BREAKER
MASTER SWITCH
EMERGENCY OPERATION SWITCH

ME-5-6115-434-12/2-14

Figure 2-14. Instrument panel (gas turbine engine controls and instruments).

(2) *Purpose.* Used in emergencies to bypass protective devices, except overspeed switch; and permit continued operation.

Warning: **The emergency operation switch must be in OFF position, with the red lockout guard in the closed (down) position. It should be used only in extreme emergencies when need for continued operation justifies risk incurred in loss of equipment, and possible injury to personnel.**

k. Master Switch (fig. 2-14).

(1) *Description.* A three position toggle switch, spring-loaded return from the up (START) position to the center (RUN) position.

(2) *Purpose.* Energizes the engine power circuit and provides a momentary start circuit until appropriate holding relays are actuated to automatically complete the starting sequence. The master switch also functions as an engine stop switch by de-energizing the engine 24v dc control circuit when placed in OFF position.

l. Generator Control Circuit Breaker (fig. 2-14).

(1) *Description.* A press-to-reset circuit breaker installed in the 60 Hz and 400 Hz generator control circuits.

(2) *Purpose.* Provide short circuit and overload protection for the generator control circuits. The circuit breaker opening amperage (15 amps) is marked on the reset button.

m. Turbine Engine Control Circuit Breaker (fig. 2-14).

(1) *Description.* A press-to-reset circuit breaker installed in the engine control circuit.

(2) *Purpose.* Provides short circuit and overload protection for the engine control circuit. The circuit breaker opening amperage (10 amps) is marked on the reset button.

n. Remote Operation Switch (fig. 2-14).

(1) *Description.* A three position toggle switch.

(2) *Purpose.* When placed in the OPERATE RESET position, the switch completes a circuit to reset and close an output contactor to deliver power to a non-operating power unit for operation of the ventilating fans in the non-operating unit. The switch returns to the center position when released. When placed in the OFF position, the switch opens the remote output contactor to stop power output to the non-operating unit.

o. Remote Operation Trip Indicator Lamp (fig. 2-14).

(1) *Description.* A filament type press-to-test lamp with a red lens.

(2) *Purpose.* Illuminates to indicate that the remote power output contactor has tripped to open and disconnected the remote load.

p. Battery Charging Circuit Breaker (fig. 2-14).

(1) *Description.* A press-to-reset circuit breaker installed in the battery charging circuit.

(2) *Purpose.* Provides short circuit and overload protection for the battery charging circuit. The circuit breaker opening amperage (5 amps) is marked on the reset button.

q. Engine Time Totalizing Meter.

(1) *Description.* A five-digit time totalizer counter installed on the side of the engine accessory drive gearcase.

(2) *Purpose.* Records the total engine operating time.

(3) *Indication.* The counter digits indicate the total operating time in hours and tenths of an hour since the last resetting of the dials. The time totalizing meter is energized and begins recording the operating time when the engine rpm reaches approximately 95 percent of governed speed and continues until engine shutdown.

r. Engine Time Totalizing Meter Circuit Breaker.

(1) *Description.* A press-to-reset circuit breaker installed in the engine time totalizing meter circuit. Located directly below the engine time totalizing meter.

(2) *Purpose.* Provides short circuit and overload protection for the time totalizing meter circuit. The circuit breaker opening amperage (3 amps) is marked on the reset button.

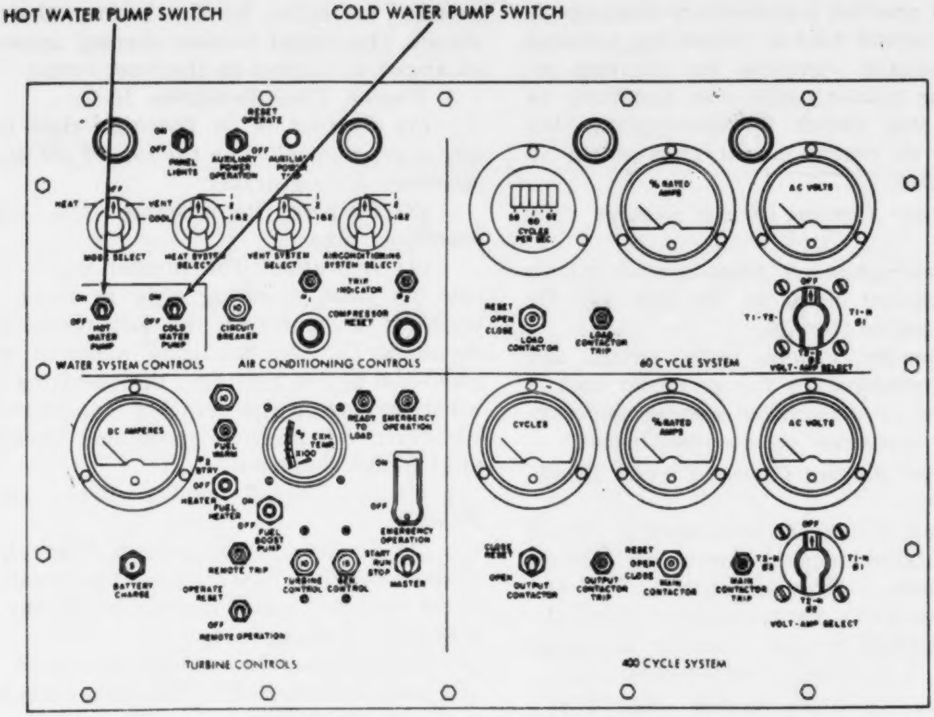
2-8. Water System Controls

a. General. The description, purpose, and function of the manually operated controls in the power unit water system are described below. The water system controls are located on the upper left of the instrument panel (fig. 2-15) and on the water inlet and outlet connection panel (fig. 2-6).

b. Hot Water Pump Switch (fig. 2-15).

(1) *Description.* A two position ON and OFF circuit breaker toggle switch.

(2) *Purpose.* Energizes the hot water pump electrical circuit when placed in the ON position. De-energizes the pump circuit when placed in the OFF position. Provides short circuit and overload protection for the hot water pump. Control of the pump is automatic depending upon hot water delivery requirements after the switch is placed in the ON position.


HOT WATER PUMP SWITCH
COLD WATER PUMP SWITCH
RESET OPERATE
ON
OFF
PANEL LIGHTS
AUXILIARY POWER OPERATION
OFF
AUXILIARY POWER TRIP
HEAT
OFF
VENT
COOL
MODE SELECT
1
2
1&2
HEAT SYSTEM SELECT
VENT SYSTEM SELECT
AIRCONDITIONING SYSTEM SELECT
TRIP INDICATOR
ON
OFF
HOT WATER PUMP
ON
OFF
COLD WATER PUMP
CIRCUIT BREAKER
COMPRESSOR RESET
WATER SYSTEM CONTROLS
AIR CONDITIONING CONTROLS
DC AMPERES
FUEL WARN
STBY
OFF
HEATER
FUEL HEATER
ON
OFF
FUEL BOOST PUMP
EXH. TEMP
X100
READY TO LOAD
EMERGENCY OPERATION
ON
OFF
EMERGENCY OPERATION
START
RUN
STOP
MASTER
BATTERY CHARGE
REMOTE TRIP
TURBINE CONTROL
GEN CONTROL
OPERATE RESET
OFF
REMOTE OPERATION
TURBINE CONTROLS
CYCLES PER SEC.
% RATED AMPS
AC VOLTS
RESET
OPEN
CLOSE
LOAD CONTACTOR
LOAD CONTACTOR TRIP
OFF
T1-T2
T1-N Ø1
T2-N Ø2
VOLT-AMP SELECT
60 CYCLE SYSTEM
CYCLES
% RATED AMPS
AC VOLTS
CLOSE RESET
OPEN
OUTPUT CONTACTOR
OUTPUT CONTACTOR TRIP
RESET
OPEN
CLOSE
MAIN CONTACTOR
MAIN CONTACTOR TRIP
T2-N Ø2
T1-N Ø1
VOLT-AMP SELECT
400 CYCLE SYSTEM

ME-5-6115-434-12/2-15

Figure 2-15. Instrument panel (water system controls).

c. Cold Water Pump Switch (fig. 2-15).

(1) *Description.* A two position ON and OFF circuit breaker toggle switch.

(2) *Purpose.* Energizes the cold water pump electrical circuit when placed in the ON position. De-energizes the pump circuit when placed in the OFF position. Provides short circuit and overload protection for the cold water pump. Control of the pump is automatic depending upon water delivery requirements after the switch is placed in the ON position.

d. Cold Water Valve (fig. 2-6).

(1) *Description.* A manually operated valve installed across the cold water outlet line.

(2) *Purpose.* Controls the flow of cold water from the cold water outlet fitting.

e. Hot Water Valve (fig. 2-6).

(1) *Description.* A manually operated valve installed across the hot water outlet line.

(2) *Purpose.* Controls the flow of hot water from the hot water outlet fitting.

2-9. Conditioned Air System Controls and Instruments

a. General. The conditioned air system controls and instruments are located on the instrument panel (fig. 2-16), conditioned air system circuit breaker panel (fig. 2-17), and the conditioned air system temperature control panel (fig. 2-18). The description, purpose,

and function of the conditioned air system controls and instruments for the power unit conditioned air system are described as follows.

b. Panel Illumination Lamps (fig. 2-16).

(1) *Description.* The four panel illumination lamps are hooded filament type lamps. The hoods are adjustable for directing the illumination on the panel.

(2) *Purpose.* Illuminates the instrument panel for night operations.

c. Panel Lights Switch (fig. 2-16).

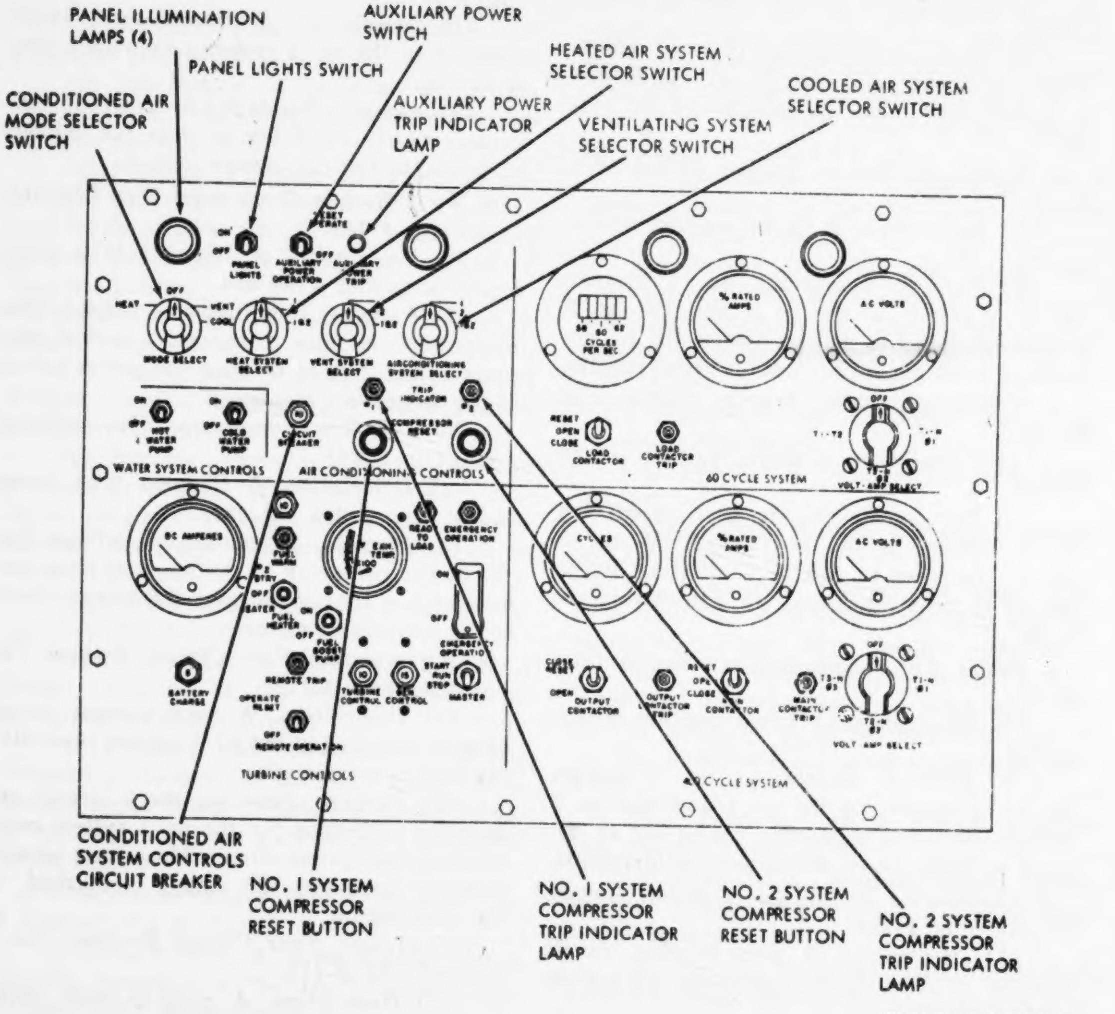
(1) *Description.* A two position ON—OFF toggle switch.

(2) *Purpose.* Energizes and de-energizes the four panel illumination lamps.

d. Auxiliary Power Switch (fig. 2-16).

(1) *Description.* A two position toggle switch.

(2) *Purpose.* Energizes an auxiliary power outlet circuit to prevent operation of the cooled air system and permit maximum 400


PANEL ILLUMINATION LAMPS (4)
AUXILIARY POWER SWITCH
PANEL LIGHTS SWITCH
HEATED AIR SYSTEM SELECTOR SWITCH
CONDITIONED AIR MODE SELECTOR SWITCH
AUXILIARY POWER TRIP INDICATOR LAMP
COOLED AIR SYSTEM SELECTOR SWITCH
VENTILATING SYSTEM SELECTOR SWITCH
MODE SELECT
HEAT SYSTEM SELECT
VENT SYSTEM SELECT
AIRCONDITIONING SYSTEM SELECT
WATER SYSTEM CONTROLS
AIR CONDITIONING CONTROLS
60 CYCLE SYSTEM
400 CYCLE SYSTEM
TURBINE CONTROLS
CONDITIONED AIR SYSTEM CONTROLS CIRCUIT BREAKER
NO. 1 SYSTEM COMPRESSOR RESET BUTTON
NO. 1 SYSTEM COMPRESSOR TRIP INDICATOR LAMP
NO. 2 SYSTEM COMPRESSOR RESET BUTTON
NO. 2 SYSTEM COMPRESSOR TRIP INDICATOR LAMP

ME-5-6115-434-12/2-16

Figure 2-16. Instrument panel (conditioned air system controls).

Hz power output through the 400 Hz auxiliary power receptacles.

e. Auxiliary Power Trip Indicator Lamp (fig. 2-16).

(1) *Description.* A filament type press-to-test lamp with a red lens.

(2) *Purpose.* Illuminates to indicate that the auxiliary power output contactor has tripped to disconnect the auxiliary power output.

f. Conditioned Air Mode Selector Switch (fig. 2-16).

(1) *Description.* A four position rotary switch.

(2) *Purpose.* Selects the type of conditioned air (heat, vent, cool, or off) as desired to be delivered from the conditioned air system.

g. Heated Air System Selector Switch (fig. 2-16).

(1) *Description.* A three position rotary switch.

(2) *Purpose.* Selects the no. 1 system, the no. 2 system, or the no. 1 and the no. 2 system combined to deliver heated air as desired to meet heated air output requirements.

h. Ventilating System Selector Switch (fig. 2-16).

(1) *Description.* A three position rotary switch.

(2) *Purpose.* Selects the no. 1 system, the no. 2 system, or the no. 1 and the no. 2 system combined to deliver ventilating air as desired to meet ventilating air output requirements.

i. Cooled Air System Selector Switch (fig. 2-16).

(1) *Description.* A three position rotary switch.

(2) *Purpose.* Selects the no. 1 system, the no. 2 system, or the no. 1 and the no. 2 system combined to deliver cooled air as desired to meet cooled air output requirements.

j. Conditioned Air System Controls Circuit Breaker (fig. 2-16).

(1) *Description.* A press-to-reset circuit breaker installed in the conditioned air system control circuit.

(2) *Purpose.* Provides short circuit and overload protection for the conditioned air system controls circuit. The circuit breaker opening amperage (10 amps) is marked on the reset button.

k. No. 1 System Compressor Reset Button (fig. 2-16).

(1) *Description.* A press-to-reset switch installed in the no. 1 system compressor power circuit.

(2) *Purpose.* Resets the no. 1 system compressor power contactor to close for delivery of power to the compressor motor.

l. No. 2 System Compressor Reset Button (fig. 2-16).

(1) *Description.* A press-to-reset switch installed in the no. 2 system compressor power circuit.

(2) *Purpose.* Resets the no. 2 system compressor power contactor to close for delivery of power to the compressor motor.

m. No. 1 System Compressor Trip Indicator Lamp (fig. 2-16).

(1) *Description.* A filament type press-to-test lamp with a red lens.

(2) *Purpose.* Illuminates to indicate that the power contactor to the no. 1 system compressor has tripped to open the power circuit to the compressor motor.

n. No. 2 System Compressor Trip Indicator Lamp (fig. 2-16).

(1) *Description.* A filament type press-to-test lamp with a red lens.

(2) *Purpose.* Illuminates to indicate that the power contactor to the no. 2 system compressor has tripped to open the power circuit to the compressor motor.

o. Recirculating Fans Circuit Breaker (no. 1 system) (fig. 2-17).

(1) *Description.* A press-to-reset circuit breaker installed in the no. 1 system recirculating fans power circuit.

(2) *Purpose.* Provides short circuit and overload protection for the no. 1 system recirculating fans power circuit. The circuit breaker opening amperage (20 amps) is marked on the reset button.

p. Condenser Fans Circuit Breaker (no. 1 system) (fig. 2-17).

(1) *Description.* A press-to-reset circuit breaker installed in the no. 1 system condenser fans power circuit.

(2) *Purpose.* Provides short circuit and overload protection for the no. 1 system condenser fans power circuit. The circuit breaker opening amperage (50 amps) is marked on the reset button.

q. Panel Illumination Lamp (fig. 2-17).

(1) *Description.* A hooded filament type lamp adjustable for directing the illumination on the panel.

(2) *Purpose.* Illuminates the circuit breaker panel for night operations. The lamp is energized by the panel lights switch (fig. 2-16).

r. Recirculating Fans Circuit Breaker (no. 2 system) (fig. 2-17).

(1) *Description.* A press-to-reset circuit breaker installed in the no. 2 system recirculating fans power circuit.

(2) *Purpose.* Provides short circuit and overload protection for the no. 2 system recirculating fans power circuit. The circuit breaker opening amperage (20 amps) is marked on the reset button.

s. Condenser Fans Circuit Breaker (no. 2 system) (fig. 2-17).

(1) *Description.* A press-to-reset circuit breaker installed in the no. 2 system condenser fans power circuit.

(2) *Purpose.* Provides short circuit and overload protection for the no. 2 system condenser fans power circuit. The circuit breaker opening amperage (50 amps) is marked on the reset button.

t. Compressor Motor Circuit Breaker (no. 1 system (fig. 2-17).

(1) *Description.* A press-to-reset circuit breaker installed in the no. 1 system compressor motor power circuit.

(2) *Purpose.* Provides short circuit and overload protection for the no. 1 system compressor motor power circuit. The circuit breaker opening amperage (100 amps) is marked on the reset bar.

u. Compressor Motor Circuit Breaker (no. 2 system) (fig. 2-17).

(1) *Description.* A press-to-reset circuit breaker installed in the no. 2 system compressor motor power circuit.

(2) *Purpose.* Provides short circuit and overload protection for the no. 2 system compressor motor power circuit. The circuit breaker opening amperage (100 amps) is marked on the reset bar.

v. Compressor Time Totalizing Meter (no. 1 system) (fig. 2-17).

(1) *Description.* A five-digit time totalizer counter.

(2) *Purpose.* Records the total compressor operating time.

(3) *Indication.* The counter digits indicate the total operating time in hours and tenths of an hour since the last resetting of the dials. The time totalizing meter is energized and begins recording when the compressor motor is energized and continues recording until the compressor is de-energized.

w. Time Totalizing Meter Circuit Breaker (no. 1 system) (fig. 2-17).

(1) *Description.* A press-to-reset circuit breaker installed in the no. 1 system time totalizing meter circuit.

(2) *Purpose.* Provides short circuit and overload protection for the no. 1 system time totalizing meter circuit. The circuit breaker opening amperage (3 amps) is marked on the reset button.

x. Compressor Time Totalizing Meter (no. 2 system) (fig. 2-17).

(1) *Description.* A five-digit time totalizer counter.

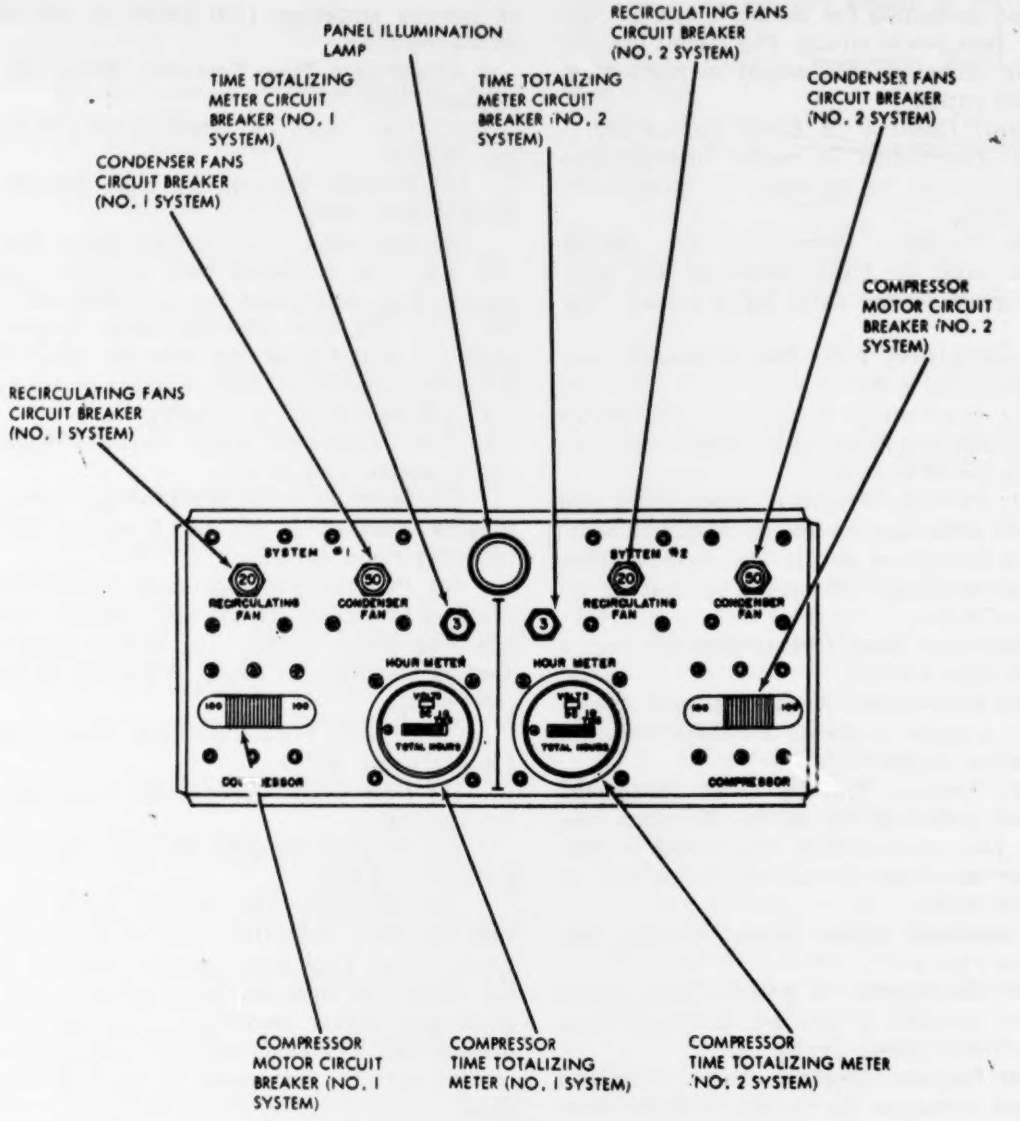
(2) *Purpose.* Records the total compressor operating time.

(3) *Indication.* The counter digits indicate the total operating time in hours and tenths of an hour since the last resetting of the dials. The time totalizing meter is energized and begins recording when the compressor motor is energized and continues recording until the compressor motor is de-energized.

y. Time Totalizing Meter Circuit Breaker (no. 2 system) (fig. 2-17).

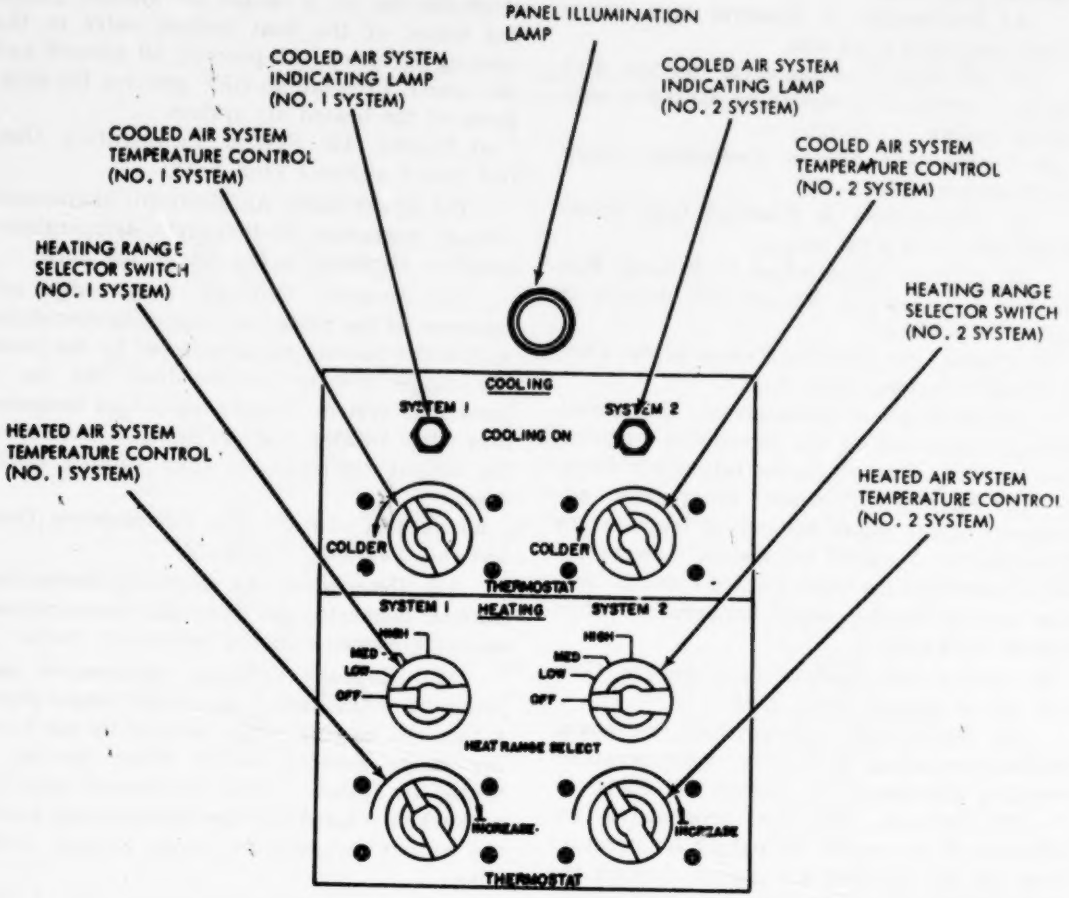
(1) *Description.* A press-to-reset circuit breaker installed in the no. 2 system time totalizing meter circuit.

(2) *Purpose.* Provides short circuit and overload protection for the no. 2 system time totalizing meter circuit. The circuit breaker opening amperage (3 amps) is marked on the reset button.


PANEL ILLUMINATION LAMP
RECIRCULATING FANS CIRCUIT BREAKER (NO. 2 SYSTEM)
TIME TOTALIZING METER CIRCUIT BREAKER (NO. 1 SYSTEM)
TIME TOTALIZING METER CIRCUIT BREAKER (NO. 2 SYSTEM)
CONDENSER FANS CIRCUIT BREAKER (NO. 2 SYSTEM)
CONDENSER FANS CIRCUIT BREAKER (NO. 1 SYSTEM)
COMPRESSOR MOTOR CIRCUIT BREAKER (NO. 2 SYSTEM)
RECIRCULATING FANS CIRCUIT BREAKER (NO. 1 SYSTEM)
SYSTEM #1
20
RECIRCULATING FAN
50
CONDENSER FAN
3
SYSTEM #2
20
RECIRCULATING FAN
50
CONDENSER FAN
3
HOUR METER
VOLTS DC
TOTAL HOURS
HOUR METER
VOLTS DC
TOTAL HOURS
100
100
COMPRESSOR
100
100
COMPRESSOR
COMPRESSOR MOTOR CIRCUIT BREAKER (NO. 1 SYSTEM)
COMPRESSOR TIME TOTALIZING METER (NO. 1 SYSTEM)
COMPRESSOR TIME TOTALIZING METER (NO. 2 SYSTEM)

ME-5-6115-434-12/2-17

Figure 2-17. Conditioned air system circuit breaker panel.


PANEL ILLUMINATION LAMP
COOLED AIR SYSTEM INDICATING LAMP (NO. 1 SYSTEM)
COOLED AIR SYSTEM INDICATING LAMP (NO. 2 SYSTEM)
COOLED AIR SYSTEM TEMPERATURE CONTROL (NO. 1 SYSTEM)
COOLED AIR SYSTEM TEMPERATURE CONTROL (NO. 2 SYSTEM)
HEATING RANGE SELECTOR SWITCH (NO. 1 SYSTEM)
HEATING RANGE SELECTOR SWITCH (NO. 2 SYSTEM)
HEATED AIR SYSTEM TEMPERATURE CONTROL (NO. 1 SYSTEM)
HEATED AIR SYSTEM TEMPERATURE CONTROL (NO. 2 SYSTEM)
COOLING
SYSTEM 1
SYSTEM 2
COOLING ON
COLDER
COLDER
THERMOSTAT
SYSTEM 1
HEATING
SYSTEM 2
HIGH
MED
LOW
OFF
HIGH
MED
LOW
OFF
HEAT RANGE SELECT
INCREASE
INCREASE
THERMOSTAT

ME-5-6115-434-12/2-18

Figure 2-18. Conditioned air system temperature control panel.

Reproduced from poor document.

z. Cooled Air System Indicating Lamp (no. 1 system (fig. 2-18).

(1) *Description.* A filament type press-to-test lamp with a red lens.

(2) *Purpose.* Illuminates to indicate that the no. 1 cooled air temperature control is calling for cooling.

aa. Cooled Air System Indicating Lamp (no. 2 system) (fig. 2-18).

(1) *Description.* A filament type press-to-test lamp with a red lens.

(2) *Purpose.* Illuminates to indicate that the no. 2 cooled air temperature control is calling for cooling.

ab. Cooled Air System Temperature Control (no. 1 system) (fig. 2-18).

(1) *Description.* An electronic thermostat control, connected to the thermister-temperature-sensitive elements in the return air ducts.

(2) *Purpose.* Provides progressive adjustment of the cooled air output temperature from the No. 1 cooled air system. Lowers the output temperature when rotated counterclockwise and raises the output temperature when rotated clockwise.

ac. Cooled Air System Temperature Control (no. 2 system) (fig. 2-18).

(1) *Description.* An electronic thermostat control, connected to thermister-temperature-sensitive elements in the return air duct.

(2) *Purpose.* Provides progressive adjustment of the cooled air output temperature from the no. 2 cooled air system. Lowers the output temperature when rotated counterclockwise and raises the output temperature when rotated clockwise.

ad. Heating Range Selector Switch (no. 1 system) (fig. 2-18).

(1) *Description.* A four position rotary switch.

(2) *Purpose.* Selects one of the three heating ranges (LOW, MED, HIGH) as desired for the no. 1 heated air system. Limits the travel of the heat control valve in the opening direction (25 percent, 50 percent and full open). Provides an OFF position for shutdown of the heated air system.

ae. Heating Range Selector Switch (no. 2 system) (fig. 2-18).

(1) *Description.* A four position rotary switch.

(2) *Purpose.* Selects one of the three heating ranges (LOW, MED, HIGH) as desired for the no. 2 heated air system. Limits the travel of the heat control valve in the opening direction (25 percent, 50 percent and full open). Provides an OFF position for shutdown of the heated air system.

af. Heated Air System Temperature Control (no. 1 system) (fig. 2-18).

(1) *Description.* An electronic thermostat control, connected to thermistor-temperature-sensitive elements in the return air ducts.

(2) *Purpose.* Provides progressive adjustment of the heated air output temperature, within the heating range selected by the heating range selector switch, from the no. 1 heated air system. Lowers the output temperature when rotated counterclockwise and raises the output temperature when rotated clockwise.

ag. Heated Air System Temperature Control (no. 2 system) (fig. 2-18).

(1) *Description.* An electronic thermostat control, connected to thermistor-temperature-sensitive elements in the return air ducts.

(2) *Purpose.* Provides progressive adjustment of the heated air output temperature, within the heating range selected by the heating range selector switch, from the no. 2 heated air system. Lowers the output temperature when rotated counterclockwise and raises the output temperature when rotated clockwise.

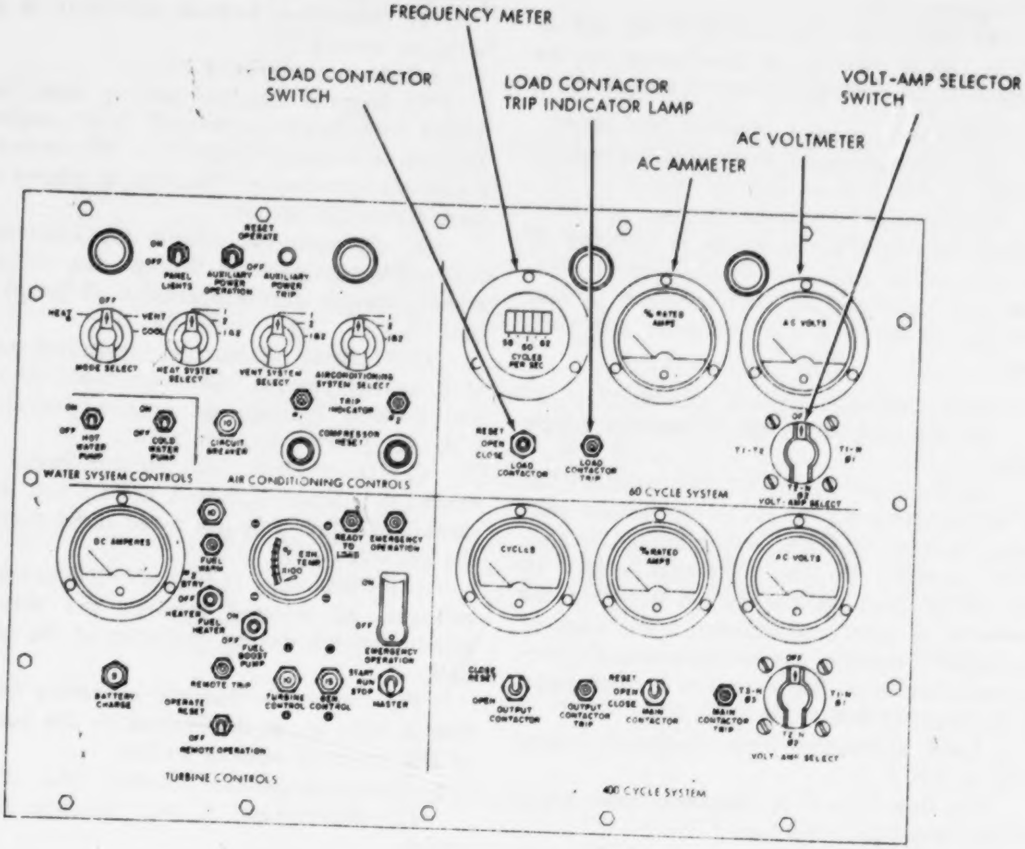
ah. Panel Illumination Lamp (fig. 2-18).

(1) *Description.* A hooded filament type lamp, adjustable for directing the illumination on the panel.

(2) *Purpose.* Illuminates the conditioned air system temperature control panel for night operations. The lamp is energized by the panel light switch (fig. 2-16).

2-10. 60 Hz Electrical System Controls and Instruments (fig. 2-19)

a. General. The 60 Hz electrical system controls and instruments are located on the instrument panel (fig. 2-19). The description, purpose, and function of the 60 Hz electrical system controls and instruments for the power unit 60 Hz electrical system are described as follows.


FREQUENCY METER
LOAD CONTACTOR SWITCH
LOAD CONTACTOR TRIP INDICATOR LAMP
VOLT-AMP SELECTOR SWITCH
AC VOLTMETER
AC AMMETER
RESET OPERATE
ON
OFF
PANEL LIGHTS
AUXILIARY POWER OPERATION
AUXILIARY POWER TRIP
HEAT
VENT
COOL
MODE SELECT
1
2
1&2
HEAT SYSTEM SELECT
VENT SYSTEM SELECT
AIRCONDITIONING SYSTEM SELECT
TRIP INDICATOR
HOT WATER PUMP
COLD WATER PUMP
CIRCUIT BREAKER
COMPRESSOR RESET
WATER SYSTEM CONTROLS
AIR CONDITIONING CONTROLS
DC AMPERES
FUEL WARM
STBY
HEATER
FUEL HEATER
FUEL BOOST PUMP
EXH TEMP
READY TO LOAD
EMERGENCY OPERATION
REMOTE TRIP
BATTERY CHARGE
OPERATE RESET
REMOTE OPERATION
TURBINE CONTROL
GEN CONTROL
START RUN STOP
MASTER
TURBINE CONTROLS
58 60 62
CYCLES PER SEC
% RATED AMPS
AC VOLTS
RESET
OPEN
CLOSE
LOAD CONTACTOR
LOAD CONTACTOR TRIP
T1-T2
T1-N Ø1
T2-N Ø2
VOLT-AMP SELECT
60 CYCLE SYSTEM
CYCLES
CLOSE RESET
OUTPUT CONTACTOR
OUTPUT CONTACTOR TRIP
MAIN CONTACTOR
MAIN CONTACTOR TRIP
400 CYCLE SYSTEM

ME-5-6115-434-12/2-19

Figure 2-19. Instrument panel (60 Hz electrical system controls and instruments).

b. Frequency Meter (fig. 2-19).

(1) *Description.* A vibrating reed type meter calibrated to indicate 58 to 62 hertz per second in one hertz increments.

(2) *Purpose.* To indicate the output frequency of the 60 Hz electrical system.

(3) *Indicating.* Normal indication during operation is 60 Hz per second. No indication is shown when not operating.

c. AC Ammeter (fig. 2-19).

(1) *Description.* Dial pointer gage, calibrated to indicate percent of rated amperes. The dial is calibrated from 0 to 125 percent in 5 percent increments. The dial range is colored red from 100 to 125 percent.

(2) *Purpose.* To indicate the line-to-line and line-to-neutral current as selected through the volt-amp selector switch during operation of the power unit.

(3) *Indication.* Normal operating range is 0 to 100 percent. Ammeter readings over 100 percent indicate an overload condition.

d. AC Voltmeter (fig. 2-19).

(1) *Description.* Dial pointer gage, calibrated to indicate 0 to 300v ac in 5 volt increments. The dial scale has red index marks at the 120 and 240 volt points.

(2) *Purpose.* Indicates line-to-line and line-to-neutral voltages, as selected through

the volt-amp selector switch during operation of the power unit.

(3) *Indication.* Normal operating indication is 120 or 240v ac as determined by the position of the volt-amp selector switch.

e. Volt-Amp Selector Switch (fig. 2-19).

(1) *Description.* A four position rotary switch.

(2) *Purpose.* Connects the ac ammeter and ac voltmeter for selective monitoring of the line-to-line and two line-to-neutral voltages and currents. An OFF position is also provided to disconnect the ammeter and voltmeter.

f. Load Contactor Switch (fig. 2-19).

(1) *Description.* A three position toggle switch.

(2) *Purpose.* In the CLOSE position the switch actuates the 60 Hz power output contactor to close, thus connecting the 60 Hz electrical system to the external load. In the OPEN position the switch actuates the contactor to open and disconnect the load. In the RESET position the switch resets the protective circuits in the generator control panel if the load contactor trip light is on.

g. Load Contactor Trip Indicator Lamp (fig. 2-19).

(1) *Description.* A filament type press-to-test lamp with a red lens.

(2) *Purpose.* Illuminates to indicate that the load contactor has tripped to disconnect the load from the 60 Hz electrical system.

2-11. 400 Hz Electrical System Controls and Instruments (fig. 2-20)

a. General. The 400 Hz electrical system controls and instruments are located on the instrument panel (fig. 2-20). The description, purpose, and function of the 400 Hz electrical system controls and instruments for the power unit 400 Hz electrical system are described as follows.

b. Frequency Meter (fig. 2-20).

(1) *Description.* Dial pointer gage, calibrated to indicate 388 to 412 hertz per second in 1/2 hertz per second increments. The dial scale has a red index mark at 400 hertz per second.

(2) *Purpose.* To indicate the output frequency of the 400 Hz electrical system.

(3) *Indication.* Normal indication is 400 hertz per second.

c. AC Ammeter (fig. 2-20).

(1) *Description.* Dial pointer gage, calibrated to indicate percent of rated amperes. The dial is calibrated from 0 to 125 percent in 5 percent increments. The dial is colored red from 100 to 125 percent.

(2) *Purpose.* To indicate the line-to-neutral current as selected through the volt-amp selector switch during operation of the power unit.

(3) *Indication.* Normal operating range is 0 to 100 percent. Ammeter readings over 100 percent indicate an overload condition.

d. AC Voltmeter (fig. 2-20).

(1) *Description.* Dial pointer gage, calibrated to indicate 0 to 150v ac in 5 volt increments. The dial scale has a red index mark at the 120 volt point.

(2) *Purpose.* Indicates line-to-neutral voltages, as selected through the volt-amp selector switch during operation of the power unit.

(3) *Indication.* Normal operating indication is 120v ac, as determined by the position of the volt-amp selector switch.

e. Volt-Amp Selector Switch (fig. 2-20).

(1) *Description.* A four position rotary switch.

(2) *Purpose.* Connects the ac ammeter and ac voltmeter for selective monitoring of the line-to-neutral voltages and currents. An OFF position is also provided to disconnect the ammeter and voltmeter.

f. Output Contactor Switch (fig. 2-20).

(1) *Description.* A three position toggle switch.

(2) *Purpose.* In the momentary RESET position the switch actuates the 400 Hz output contactor to reset and close the output contacts connecting the 400 Hz electrical system to the external load. When released, the switch returns to the CLOSE position. In the OPEN position the switch actuates the contactor to open the output contacts and disconnect the external load. The RESET function of the switch is bypassed when the emergency switch is ON.

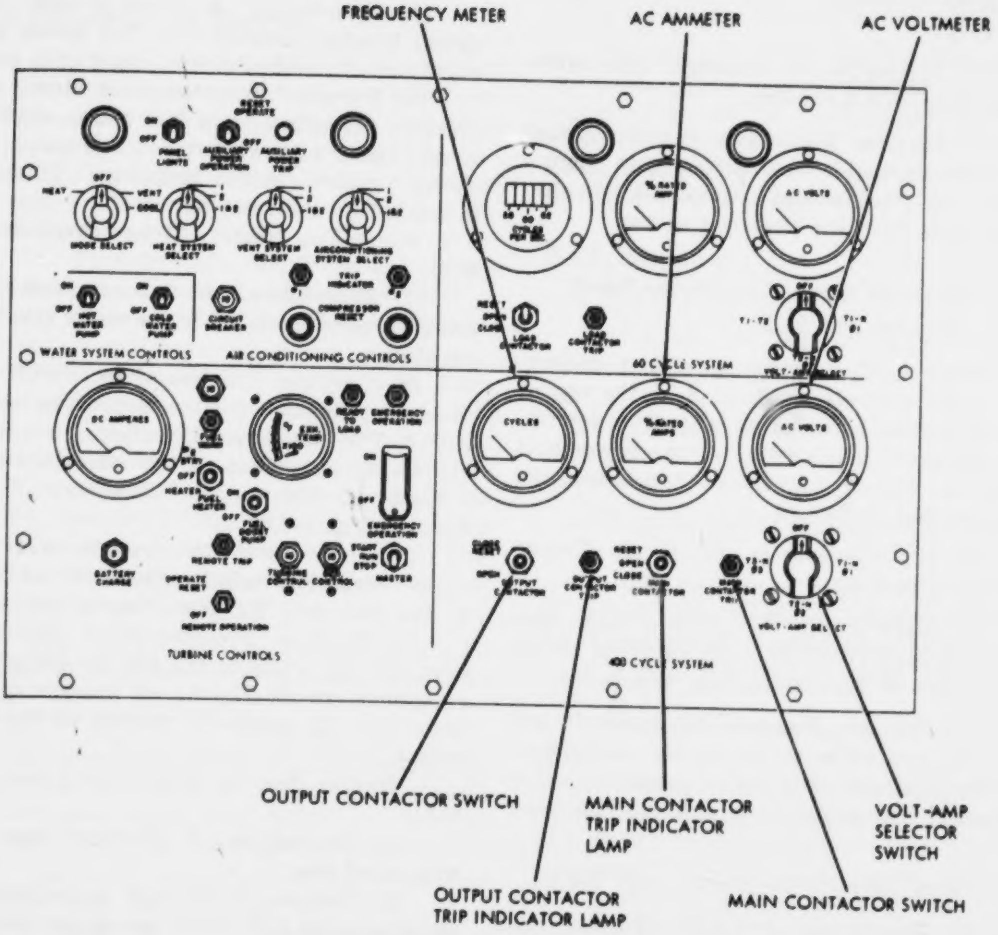

FREQUENCY METER
AC AMMETER
AC VOLTMETER
WATER SYSTEM CONTROLS
AIR CONDITIONING CONTROLS
60 CYCLE SYSTEM
TURBINE CONTROLS
400 CYCLE SYSTEM
OUTPUT CONTACTOR SWITCH
MAIN CONTACTOR TRIP INDICATOR LAMP
VOLT-AMP SELECTOR SWITCH
OUTPUT CONTACTOR TRIP INDICATOR LAMP
MAIN CONTACTOR SWITCH
ME-5-6115-434-12/2-20

Figure 2-20. Instrument panel (400 Hz electrical system controls and instruments).

g. Output Contactor Trip Indicator Lamp (fig. 2-20).

(1) *Description.* A filament type press-to-test lamp with a red lens.

(2) *Purpose.* Illuminates to indicate that the output contactor has tripped to disconnect the external load from the 400 Hz electrical system.

h. Main Contactor Switch (fig. 2-20).

(1) *Description.* A three position toggle switch.

(2) *Purpose.* In the CLOSE position, the switch actuates the main contactor to close and connect the external and internal 400 Hz electrical load to the electrical system. In the OPEN position, the switch actuates the main contactor to open and disconnect the external and internal 400 Hz electrical load from the electrical system. In the RESET position the switch resets the protective circuits in the generator control panel if the main contactor trip light is ON.

i. Main Contactor Trip Indicator Lamp (fig. 2-20).

(1) *Description.* A filament type press-to-test lamp with a red lens.

(2) *Purpose.* Illuminates to indicate that the main contactor has tripped and disconnected and external and internal 400 Hz electrical loads from the electrical system.

2-21. Electrical Output Connection Panel Controls (fig. 2-3)

a. General. The electrical output connection panel controls are located at the top of the connection panel (fig. 2-3). The description, purpose, and function of the power unit electrical output connection panel controls are described as follows.

b. 60 Hz Convenience Receptacle Circuit Breaker (fig. 2-3).

(1) *Description.* A press-to-reset type circuit breaker installed in the electrical circuit to the two 60 Hz convenience receptacles.

(2) *Purpose.* Provides short circuit and overload protection to the 60 Hz convenience receptacle circuit. The circuit breaker opening amperage (15 amps) is marked on the reset bar.

c. Panel Illumination Lamp (fig. 2-3).

(1) *Description.* A hooded filament type lamp adjustable for directing the illumination on the panel.

(2) *Purpose.* Illuminates the electrical output connection panel for night operations. The lamp is energized by the panel lights switch (fig. 2-16).

d. Fuel Heater Circuit Breaker (fig. 2-3).

(1) *Description.* A press-to-reset type circuit breaker installed in a fuel heater electrical circuit (used with winterized units only).

(2) *Purpose.* Provides short circuit and overload protection for a fuel heater electrical circuit (used with winterized units only). The circuit breaker opening amperage (60 amps) is marked on the reset button.

e. Water Line Heaters Circuit Breaker (fig. 2-3).

(1) *Description.* A press-to-reset type circuit breaker installed in the water line heaters circuit.

(2) *Purpose.* Provides short circuit and overload protection for the water line heaters circuit. The circuit breaker opening amperage (15 amps) is marked on the reset button.

f. 400 Hz Convenience Receptacle Circuit Breaker (fig. 2-3).

(1) *Description.* A press-to-reset type circuit breaker installed in the electrical circuit to the two 400 Hz convenience receptacles.

(2) *Purpose.* Provides short circuit and overload protection to the 400 Hz convenience receptacle circuit. The circuit breaker opening amperage (15 amps) is marked on the reset button.

g. Reverse Polarity Indicating Lamp (fig. 2-3).

(1) *Description.* A filament type bulb with a red lens.

(2) *Purpose.* Illuminates to indicate that an external 24 v dc power source has been connected to the external dc power source connector (fig. 2-3) with the polarity reversed in comparison with the power unit dc circuits.

h. Cold Weather Heaters and Battery Activation Switches (fig. 2-3). Used with winterized units only.

Section IV. OPERATION UNDER USUAL CONDITIONS

2-13. General

a. The instructions in this section are published for the information and guidance of personnel responsible for operation of the power unit.

b. The operator must know how to perform every operation of which the power unit is capable. This section gives instructions on starting and stopping the power unit, operation of the power unit, and on coordinating the basic motions to perform the specific tasks for which the equipment is designed. Since nearly every job presents a different problem, the operator may have to vary given procedures to fit the individual job.

2-14. Starting

a. Preparation for Starting.

(1) If the power unit is to be operated for the first time since receipt, check that inspection and servicing procedures described in paragraph 2-1 have been performed.

(2) Check that installation and setting up instructions have been accomplished as described in paragraph 2-3.

(3) Perform daily inspection and service procedures as described in paragraph 3-6.

(4) Make sure adequate fuel is available for anticipated operating period.

(5) If water service is to be used, make sure adequate supply is available and that water system has been properly connected and primed as described in paragraph 2-3*b*(5).

(6) If conditioned air system is to be operated, open condenser air inlet panels (fig. 2-21) and condenser air outlet doors (fig. 2-21). Make sure panels and doors are secured in the open position.

Note. Access to the top of the power unit for opening the condenser air inlet panels is provided by four folding steps (fig. 2-21) on the right rear corner of the enclosure.

(7) Open the engine air inlet door (fig. 2-21) and secure in the open position with the two door braces (fig. 2-21).

(8) Open the instrument panel access door (fig. 2-21) and secure in the up position with the door fastener (fig. 2-21).

(9) Open the circuit breaker panel access door (fig. 2-21) and the air temperature control panel access door.

(10) Check all doors and panels not specifically opened in the above steps to insure that they are closed and securely fastened.

(11) Open the fuel shutoff valve (fig. 2-21).

b. Starting. Refer to figure 2-22 and start the power unit.

Warning: **Operators working in the area of equipment generating high frequency noises, especially if such equipment is operating in a confined area, will be required to wear ear plugs, supplemented by ear protectors. See your safety or medical officer for examination requirements and federal stock number for ear plugs and ear protectors.**

Caution: **If starter does not disengage at approximately 35 percent governed speed during start procedure, place master switch in STOP position. If power unit does not shut down, disconnect battery cables from battery terminals to stop the power unit.**

2-15. Stopping

a. Preparation for Stopping.

(1) Close hot and cold water valves on water inlet and outlet connection panel (fig. 2-21).

(2) If possible, shut off external equipment powered by 60 Hz and 400 Hz electrical systems.

b. Stopping. Refer to figure 2-23 and stop the power unit.

c. After Operation Procedures. Unless power unit shutdown is only temporary, perform the following procedures after stopping.

(1) Shut off water supply to the power unit.

(2) Shut off fuel supply to the power unit.

(3) Close and secure condenser air inlet panels (fig. 2-21), condenser air outlet doors (fig. 2-21), engine inlet door (fig. 2-21), air temperature control panel access door (fig. 2-21), conditioned air system circuit breaker panel access door (fig. 2-21), and instrument panel access door (fig. 2-21).

2-16. Operation of Equipment

a. Operation to Deliver 60 Hz Electrical Power. Refer to figure 2-24 for operation of the 60 Hz electrical system.

Warning: **In case of accident from electrical shock, shut down power unit at once. If power unit cannot be shut down, free victim from live conductor with a board or any nonconductor. If victim is unconscious, apply artificial respiration and obtain medical help.**

b. Operation to Deliver 400 Hz Electrical Power. Refer to figure 2-25 for operation of 400 Hz electrical system.

***Warning:* In case of accident from electric shock, shut down power unit at once. If power unit cannot be shut down, free victim from live conductor with a board or any nonconductor. If victim is unconscious, apply artificial respiration and obtain medical help.**

c. Operation to Deliver Cooled Air. Refer to figure 2–26 for operation of cooled air system.

Note. Vent air doors (fig. 2–21) should be opened as required during operation of the cooled air system to permit intake of makeup air to the system.

***Caution:* Condenser air inlet panels (fig. 2–21) and condenser air outlet doors (fig. 2–21) must be open before operating the cooled air system.**

d. Operation to Deliver Heated Air. Refer to figure 2–27 for operation of heated air system.

Note. Vent air doors (fig. 2–21) should be opened as required during operation of the heated air system to permit intake of makeup air to the system.

e. Operation to Deliver Ventilating Air. Refer to figure 2–28 for operation of ventilating air system.

Note. Vent air doors (fig. 2–21) should be opened as required during operation of the ventilating air system to permit intake of makeup air to the system.

f. Operation to Deliver Compressed Air. Refer to figure 2–29 for operation of compressed air system.

g. Operation to Deliver Hot and Cold Water. Refer to figure 2–30 for operation to deliver hot and cold water.

Note. Water system shall have been primed and connected as described in paragraph 2–3, *b*, (5) prior to attempting water delivery.

h. Operation to Provide Vacuum Suction. Refer to figure 2–31 for operation of the vacuum system.

i. Emergency Operation. If the protective devices in the power unit shut down engine or generator operation for any reason other than engine overspeeding, the protective devices can be bypassed and operation of the power unit continued on an emergency basis. When such operation is imperative, open the lockout cover over the emergency operation switch (fig. 2–22) and place switch in ON position. When emergency operation is no longer required, place the switch in the OFF position and correct condition that caused actuation of the protective devices before continuing operation.

***Warning:* The emergency operation switch should be used only in extreme emergencies when need for continued operation justifies risks incurred in loss of equipment and possible injury to personnel.**

j. Standby Operation. When it is desirable, or necessary, to have a standby power unit available for immediate takeover of 60 Hz and 400 Hz electrical power delivery in event of malfunction of an operating power unit, the standby power unit should be connected as follows.

Note. Emergency power transfer electrical kit assembly is required for interconnecting the electrical outputs of the standby power unit and the operating power unit.

(1) Place standby power unit as close as practical to the operating power unit. If power units cannot be positioned within 50 feet, additional cable assemblies will be required to interconnect the power units and the emergency power transfer electrical kit assembly.

Note. If greater separation of power units is required, connect additional power cable assemblies together and use adapter cable assemblies provided with electrical kit assembly to connect additional standby operation cable assemblies together.

(2) Check that standby power unit is in fully operable condition and that batteries are fully charged. Check that standby unit is adequately supplied with fuel.

(3) Check that all controls on standby unit are in OFF, OPEN, or prestart position. Refer to paragraph 2–14. Check that engine air inlet door is secured in open position.

(4) Connect 60 Hz and 400 Hz power cable assemblies to output receptacles on electrical output connection panel (fig. 2–3) on both power units and connect other end of cable assemblies to appropriate receptacles on emergency power transfer electrical kit assembly.

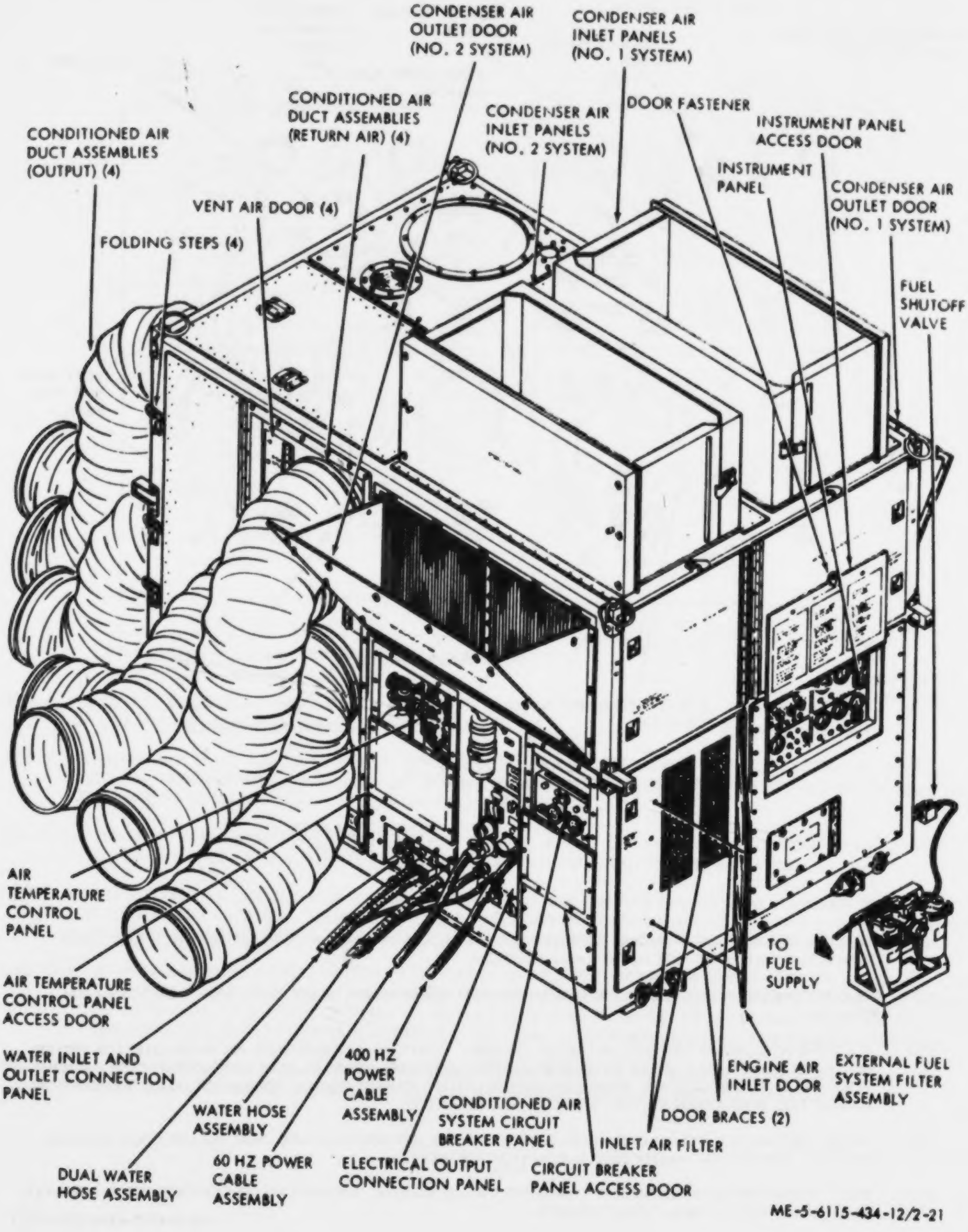
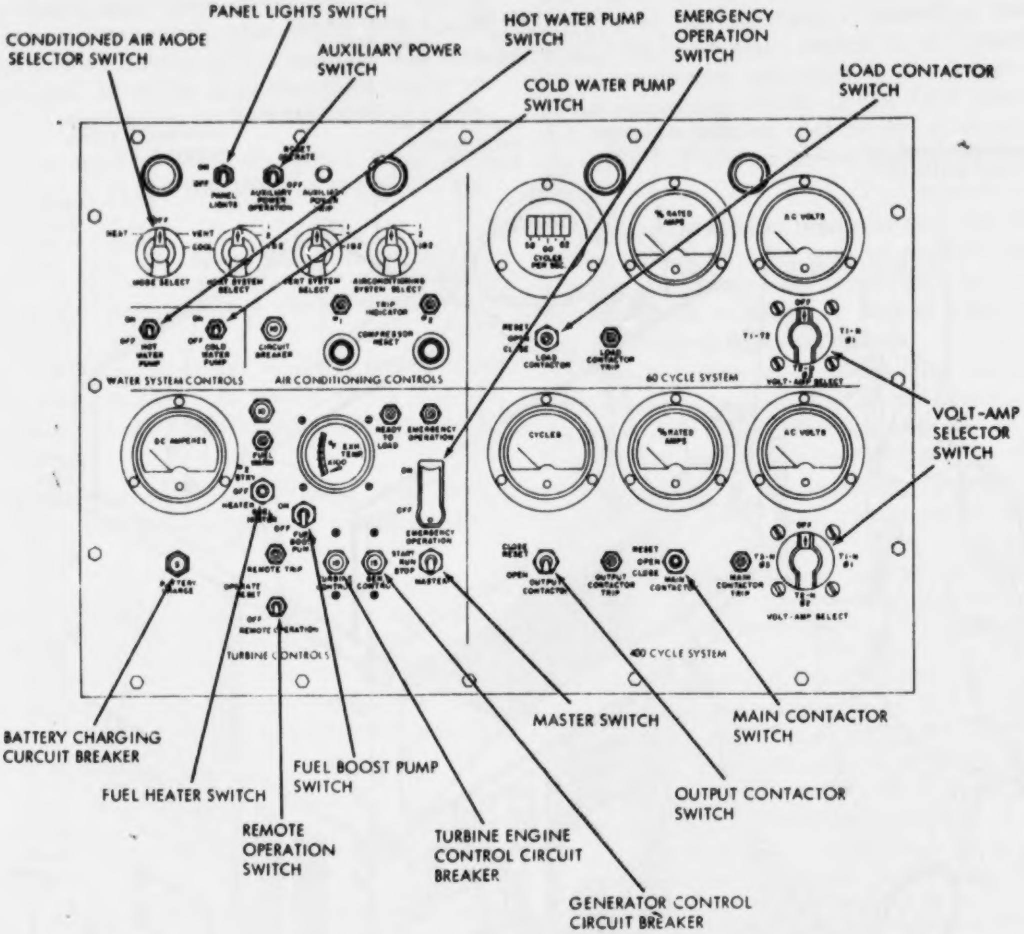

CONDENSER AIR OUTLET DOOR (NO. 2 SYSTEM)
CONDENSER AIR INLET PANELS (NO. 1 SYSTEM)
CONDITIONED AIR DUCT ASSEMBLIES (RETURN AIR) (4)
CONDENSER AIR INLET PANELS (NO. 2 SYSTEM)
DOOR FASTENER
INSTRUMENT PANEL ACCESS DOOR
CONDITIONED AIR DUCT ASSEMBLIES (OUTPUT) (4)
INSTRUMENT PANEL
CONDENSER AIR OUTLET DOOR (NO. 1 SYSTEM)
VENT AIR DOOR (4)
FOLDING STEPS (4)
FUEL SHUTOFF VALVE
AIR TEMPERATURE CONTROL PANEL
AIR TEMPERATURE CONTROL PANEL ACCESS DOOR
TO FUEL SUPPLY
WATER INLET AND OUTLET CONNECTION PANEL
400 HZ POWER CABLE ASSEMBLY
ENGINE AIR INLET DOOR
EXTERNAL FUEL SYSTEM FILTER ASSEMBLY
WATER HOSE ASSEMBLY
CONDITIONED AIR SYSTEM CIRCUIT BREAKER PANEL
DOOR BRACES (2)
INLET AIR FILTER
DUAL WATER HOSE ASSEMBLY
60 HZ POWER CABLE ASSEMBLY
ELECTRICAL OUTPUT CONNECTION PANEL
CIRCUIT BREAKER PANEL ACCESS DOOR
ME-5-6115-434-12/2-21

Figure 2-21. Power unit connected and opened for normal operation.


PANEL LIGHTS SWITCH
CONDITIONED AIR MODE SELECTOR SWITCH
AUXILIARY POWER SWITCH
HOT WATER PUMP SWITCH
EMERGENCY OPERATION SWITCH
COLD WATER PUMP SWITCH
LOAD CONTACTOR SWITCH
VOLT-AMP SELECTOR SWITCH
WATER SYSTEM CONTROLS
AIR CONDITIONING CONTROLS
60 CYCLE SYSTEM
400 CYCLE SYSTEM
TURBINE CONTROLS
REMOTE TRIP
BATTERY CHARGING CURCUIT BREAKER
FUEL HEATER SWITCH
REMOTE OPERATION SWITCH
FUEL BOOST PUMP SWITCH
TURBINE ENGINE CONTROL CIRCUIT BREAKER
GENERATOR CONTROL CIRCUIT BREAKER
MASTER SWITCH
MAIN CONTACTOR SWITCH
OUTPUT CONTACTOR SWITCH

NOTE: ENGINE WILL NOT START IF ENGINE AIR INLET DOOR IS CLOSED OR IF MAIN CONTACTOR SWITCH AND LOAD CONTACTOR SWITCH ARE NOT IN THE OPEN POSITION.

NOTE: IF LIGHT CONDITION REQUIRES ILLUMINATION OF INSTRUMENT PANEL, PLACE PANEL LIGHTS SWITCH IN ON POSITION.

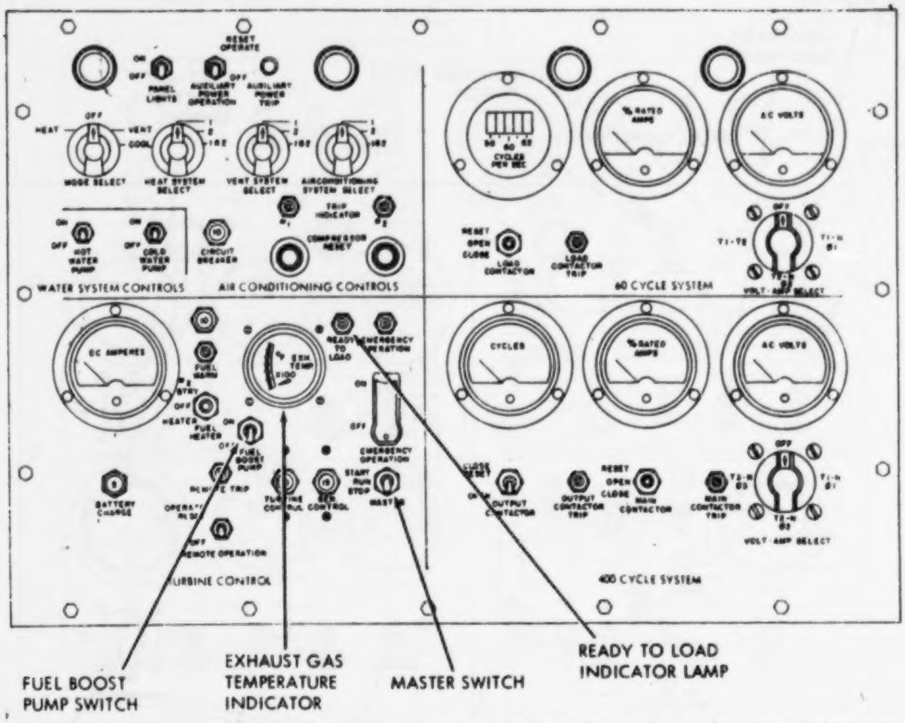
STEP 1. PLACE THE FOLLOWING SWITCHES IN THE OFF OR OPEN POSITION: CONDITIONED AIR MODE SELECTOR SWITCH, HOT WATER PUMP SWITCH, COLD WATER PUMP SWITCH, AUXILIARY POWER SWITCH, LOAD CONTACTOR SWITCH, VOLT-AMP SELECTOR SWITCHES, MAIN CONTACTOR SWITCH, OUTPUT CONTACTOR SWITCH, REMOTE OPERATION SWITCH, FUEL BOOST PUMP SWITCH, AND FUEL HEATER SWITCH.

STEP 2. CHECK THAT THE EMERGENCY OPERATION SWITCH IS IN THE OFF POSITION AND THAT THE LOCKOUT COVER IS IN PLACE. CHECK THAT MASTER SWITCH IS IN STOP POSITION.

STEP 3. PRESS IN RESET BUTTONS FOR BATTERY CHARGING CIRCUIT BREAKER, TURBINE ENGINE CONTROL CIRCUIT BREAKER, AND GENERATOR CONTROL CIRCUIT BREAKER.

ME-5-6115-434-12/2-22 ①

Figure 2-22. Starting the power unit (Sheet 1 of 2).


RESET
OPERATE
ON
OFF
PANEL LIGHTS
AUXILIARY POWER OPERATION
AUXILIARY POWER TRIP
OFF
HEAT
VENT
COOL
MODE SELECT
HEAT SYSTEM SELECT
VENT SYSTEM SELECT
AIRCONDITIONING SYSTEM SELECT
TRIP INDICATOR
HOT WATER PUMP
COLD WATER PUMP
CIRCUIT BREAKER
COMPRESSOR RESET
WATER SYSTEM CONTROLS
AIR CONDITIONING CONTROLS
CYCLES PER SEC
% RATED AMPS
AC VOLTS
RESET
OPEN
CLOSE
LOAD CONTACTOR
LOAD CONTACTOR TRIP
60 CYCLE SYSTEM
VOLT - AMP SELECT
DC AMPERES
FUEL WARM
HEATER
FUEL HEATER
EXH TEMP
READY TO LOAD
EMERGENCY OPERATION
ON
OFF
FUEL BOOST PUMP
BATTERY CHARGE
TURBINE CONTROL
SEQ CONTROL
START
RUN
STOP
MASTER
REMOTE OPERATION
CYCLES
% RATED AMPS
AC VOLTS
OUTPUT CONTACTOR
OUTPUT CONTACTOR TRIP
MAIN CONTACTOR
MAIN CONTACTOR TRIP
VOLT - AMP SELECT
400 CYCLE SYSTEM
FUEL BOOST PUMP SWITCH
EXHAUST GAS TEMPERATURE INDICATOR
MASTER SWITCH
READY TO LOAD INDICATOR LAMP

STEP 4. PLACE FUEL BOOST PUMP SWITCH IN ON POSITION AND MASTER SWITCH IN RUN POSITION. OBSERVE BY SOUND OR VIBRATION THAT FUEL BOOST PUMP IS OPERATING.

STEP 5. MOMENTARILY PLACE MASTER SWITCH IN START POSITION, THEN RELEASE MASTER SWITCH TO RETURN TO RUN POSITION. ENGINE WILL AUTOMATICALLY START AND ACCELERATE TO GOVERNED SPEED. FUEL BOOST PUMP WILL CONTINUE TO OPERATE BUT SWITCH WILL DROP TO OFF POSITION.

CAUTION: DO NOT EXCEED STARTER MOTOR DUTY CYCLE OF ONE MINUTE ON AND ONE MINUTE OFF OR FIVE STARTS IN TEN MINUTES. A ONE MINUTE TIME DELAY RELAY (K4) WILL LIMIT STARTER OPERATION.

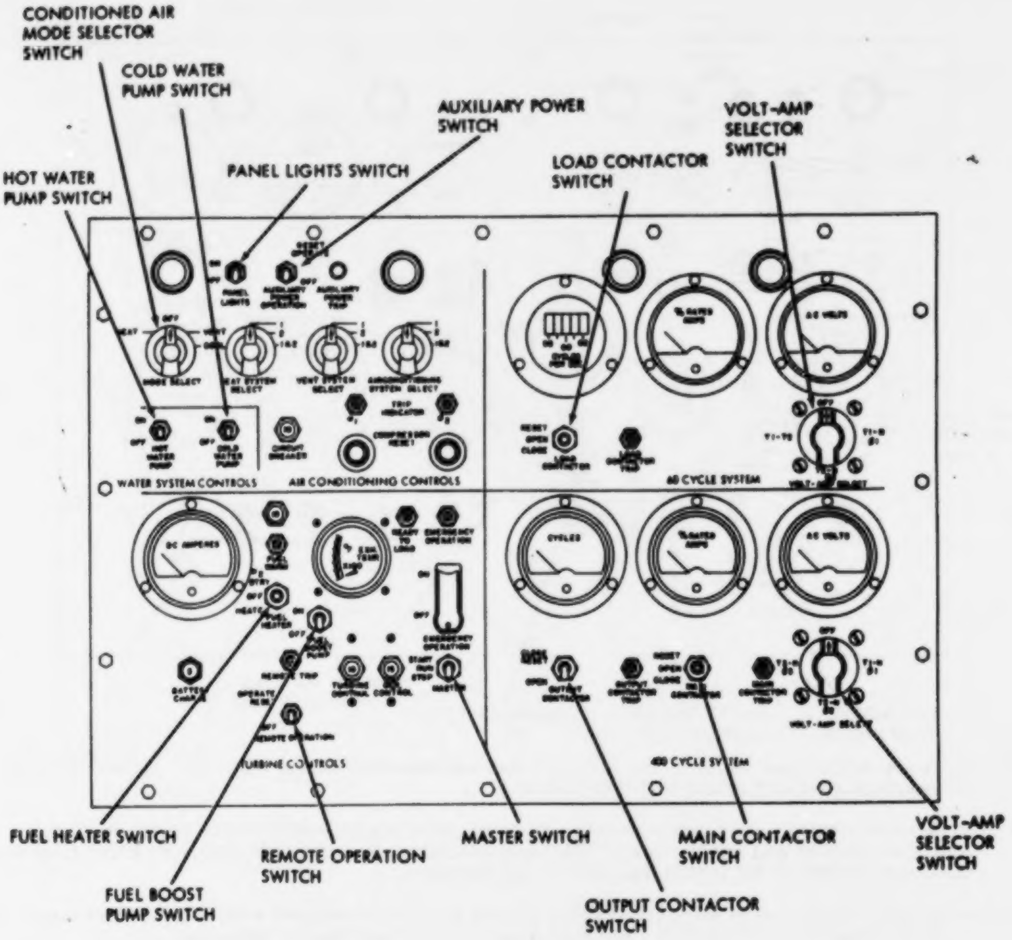
STEP 6. LISTEN FOR ENGINE COMBUSTION (CHARACTERISTIC ROAR) AND OBSERVE EXHAUST GAS TEMPERATURE INDICATOR FOR TEMPERATURE INCREASE. OBSERVE THAT READY TO LOAD INDICATOR LAMP ILLUMINATES WITHIN 60 SECONDS INDICATING THAT ENGINE HAS ACCELERATED TO GOVERNED SPEED AND IS READY FOR APPLICATION OF LOAD.

CAUTION: IMMEDIATELY PLACE MASTER SWITCH IN STOP POSITION TO SHUT DOWN ENGINE OPERATION IF COMBUSTION DOES NOT OCCUR, IF EXHAUST GAS TEMPERATURE EXCEEDS 1300°F (704°C) DURING ACCELERATION, IF READY TO LOAD INDICATOR LAMP DOES NOT ILLUMINATE WITHIN 60 SECONDS, OR IF UNUSUAL NOISE OR OBVIOUS MALFUNCTION OCCURS. REFER TO CHAPTER 3, SECTION IV, TROUBLESHOOTING FOR REMEDIAL ACTION.

NOTE: WHEN PRACTICABLE, THE ENGINE SHOULD BE OPERATED FOR A TWO TO FIVE MINUTE WARMUP PERIOD BEFORE APPLYING LOAD TO REDUCE THERMAL STRESSES ON THE TURBINE WHEEL AND PROLONG ENGINE LIFE.

ME-5-6115-434-12/2-22 ②

Figure 2-22. Starting the power unit (Sheet 2 of 2).


CONDITIONED AIR MODE SELECTOR SWITCH
COLD WATER PUMP SWITCH
AUXILIARY POWER SWITCH
VOLT-AMP SELECTOR SWITCH
HOT WATER PUMP SWITCH
PANEL LIGHTS SWITCH
LOAD CONTACTOR SWITCH
WATER SYSTEM CONTROLS
AIR CONDITIONING CONTROLS
60 CYCLE SYSTEM
TURBINE CONTROLS
400 CYCLE SYSTEM
FUEL HEATER SWITCH
REMOTE OPERATION SWITCH
MASTER SWITCH
MAIN CONTACTOR SWITCH
VOLT-AMP SELECTOR SWITCH
FUEL BOOST PUMP SWITCH
OUTPUT CONTACTOR SWITCH

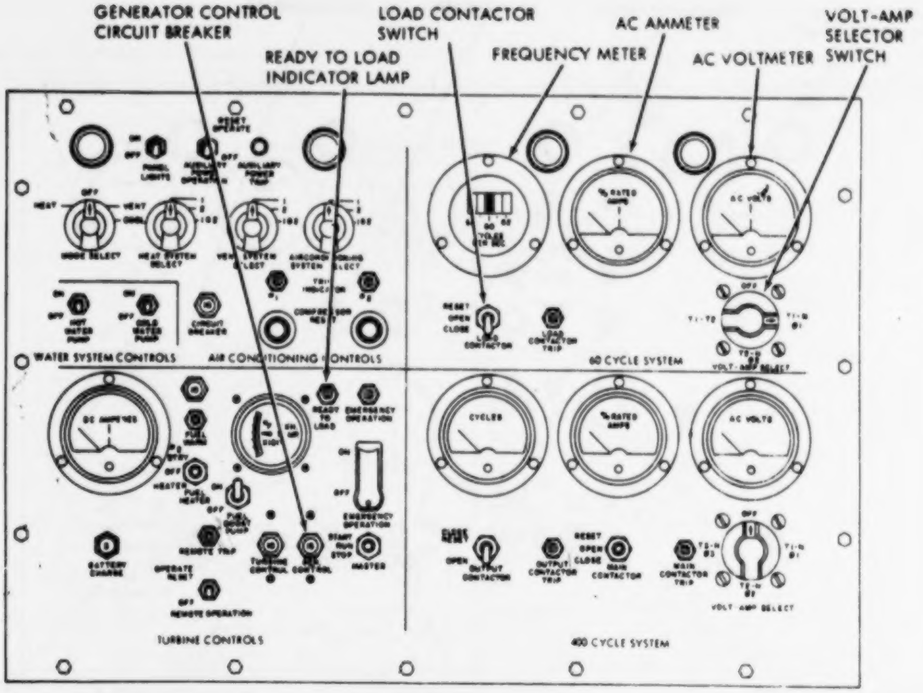
STEP 1. PLACE THE FOLLOWING SWITCHES IN THE OFF OR OPEN POSITION: CONDITIONED AIR MODE SELECTOR SWITCH, HOT WATER PUMP SWITCH, COLD WATER PUMP SWITCH, AUXILIARY POWER SWITCH, LOAD CONTACTOR SWITCH, VOLT-AMP SELECTOR SWITCHES, MAIN CONTACTOR SWITCH, OUTPUT CONTACTOR SWITCH, REMOTE OPERATION SWITCH, AND FUEL HEATER SWITCH.

NOTE: WHEN PRACTICABLE, THE ENGINE SHOULD BE OPERATED FOR A TWO TO FIVE MINUTE PERIOD AT NO LOAD PRIOR TO STOPPING TO REDUCE THERMAL STRESSES ON THE ENGINE TURBINE WHEEL AND PROLONG ENGINE LIFE.

STEP 2. PLACE MASTER SWITCH IN STOP POSITION AND ALLOW ENGINE TO COME TO A COMPLETE STOP.

ME-5-6115-434-12/2-23

Figure 2-23. Stopping the power unit.


GENERATOR CONTROL CIRCUIT BREAKER
LOAD CONTACTOR SWITCH
READY TO LOAD INDICATOR LAMP
FREQUENCY METER
AC AMMETER
AC VOLTMETER
VOLT-AMP SELECTOR SWITCH
WATER SYSTEM CONTROLS
AIR CONDITIONING CONTROLS
60 CYCLE SYSTEM
TURBINE CONTROLS
400 CYCLE SYSTEM

WARNING: IN CASE OF ACCIDENT FROM ELECTRIC SHOCK, SHUT DOWN POWER UNIT AT ONCE. IF POWER UNIT CANNOT BE SHUT DOWN, FREE VICTIM FROM LIVE CONDUCTOR WITH A BOARD OR ANY NONCONDUCTOR. IF VICTIM IS UNCONSCIOUS, APPLY ARTIFICIAL RESPIRATION AND OBTAIN MEDICAL HELP.

STEP 1. CHECK THAT 60 HZ ELECTRICAL POWER OUTPUT CABLE ASSEMBLY IS SECURELY CONNECTED TO THE ELECTRICAL OUTPUT RECEPTACLE AND TO THE POINT OF USE.

STEP 2. CHECK THAT READY TO LOAD INDICATOR LAMP IS ILLUMINATED INDICATING THAT ENGINE IS READY FOR LOAD.

STEP 3. CHECK THAT RESET BUTTON ON GENERATOR CONTROL CIRCUIT BREAKER IS PUSHED IN.

STEP 4. PLACE VOLT-AMP SELECTOR SWITCH TO T1-N, T2-N, OR T1-T2 POSITION.

STEP 5. PLACE LOAD CONTACTOR SWITCH IN CLOSE POSITION. OBSERVE AC VOLTMETER FOR VOLTAGE READING. IF NO VOLTAGE IS INDICATED, MOMENTARILY PLACE LOAD CONTACTOR SWITCH IN RESET POSITION AND THEN BACK TO CLOSE POSITION.

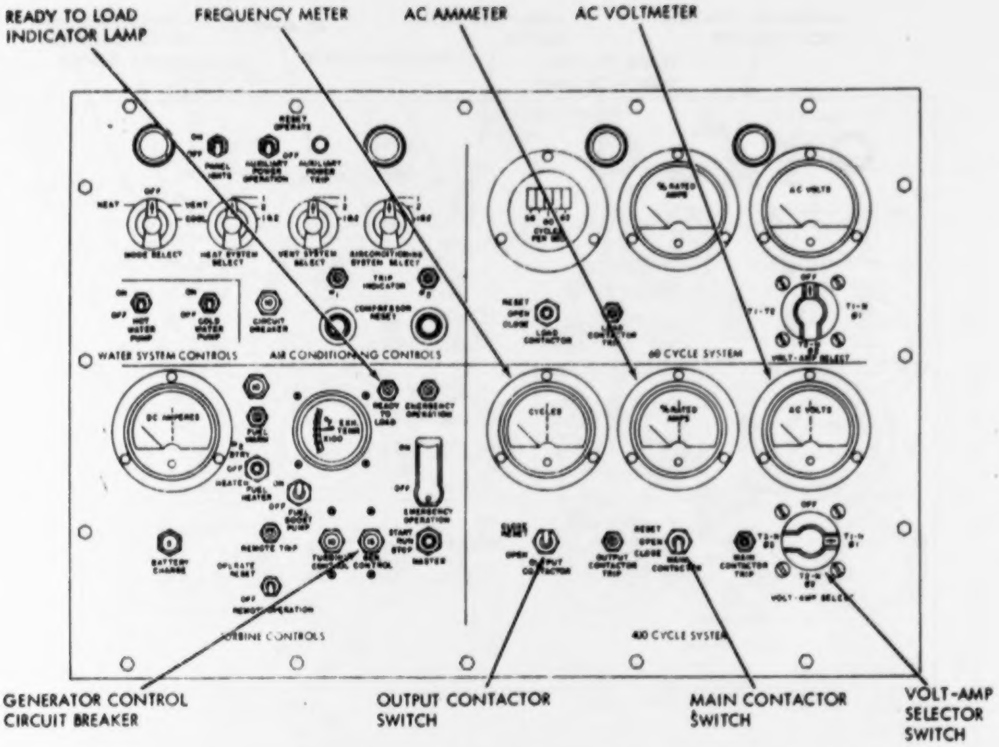
STEP 6. OBSERVE THAT FREQUENCY INDICATED ON FREQUENCY METER IS 60 HZ PER SECOND. VOLTAGE AND AMPERAGE OUTPUT MAY BE MONITORED BY POSITIONING VOLT-AMP SELECTOR SWITCH TO APPROPRIATE PHASE AND OBSERVING AC AMMETER AND AC VOLTMETER.

CAUTION: PLACE LOAD CONTACTOR SWITCH IN OPEN POSITION IF 60 HZ ELECTRICAL OUTPUT IS UNATTAINABLE OR ANY OTHER OBVIOUS ELECTRICAL MALFUNCTION OCCURS. REFER TO CHAPTER 3, SECTION IV, TROUBLESHOOTING FOR REMEDIAL ACTION.

NOTE: IF 60 HZ POWER IS REQUIRED AT THE 60 HZ CONVENIENCE RECEPTACLES ON THE ELECTRICAL OUTPUT CONNECTION PANEL, PRESS RESET BAR ON 60 HZ CONVENIENCE RECEPTACLES CIRCUIT BREAKER IN TO CONNECT CIRCUIT.

ME-5-6115-434-12/2-24

Figure 2-24. Operation to deliver 60 Hz electrical power.


READY TO LOAD INDICATOR LAMP
FREQUENCY METER
AC AMMETER
AC VOLTMETER
WATER SYSTEM CONTROLS
AIR CONDITIONING CONTROLS
60 CYCLE SYSTEM
TURBINE CONTROLS
400 CYCLE SYSTEM
GENERATOR CONTROL CIRCUIT BREAKER
OUTPUT CONTACTOR SWITCH
MAIN CONTACTOR SWITCH
VOLT-AMP SELECTOR SWITCH

WARNING: IN CASE OF ACCIDENT FROM ELECTRIC SHOCK, SHUT DOWN POWER UNIT AT ONCE. IF POWER UNIT CANNOT BE SHUT DOWN, FREE VICTIM FROM LIVE CONDUCTOR WITH A BOARD OR ANY NONCONDUCTOR. IF VICTIM IS UNCONSCIOUS, APPLY ARTIFICIAL RESPIRATION AND OBTAIN MEDICAL HELP.

STEP 1. CHECK THAT 400 HZ ELECTRICAL POWER OUTPUT CABLE ASSEMBLY IS SECURELY CONNECTED TO THE ELECTRICAL OUTPUT RECEPTACLE AND TO THE POINT OF USE.

STEP 2. CHECK THAT READY TO LOAD INDICATOR LAMP IS ILLUMINATED INDICATING THAT ENGINE IS READY FOR LOAD.

STEP 3. CHECK THAT RESET BUTTON ON GENERATOR CONTROL CIRCUIT BREAKER IS PUSHED IN.

STEP 4. PLACE VOLT-AMP SELECTOR SWITCH TO T1-N, T2-N, OR T3-N POSITION.

STEP 5. MOVE MAIN CONTACTOR SWITCH MOMENTARILY TO RESET POSITION THEN TO CLOSE POSITION. MOMENTARILY MOVE OUTPUT CONTACTOR SWITCH TO CLOSE RESET POSITION THEN RELEASE.

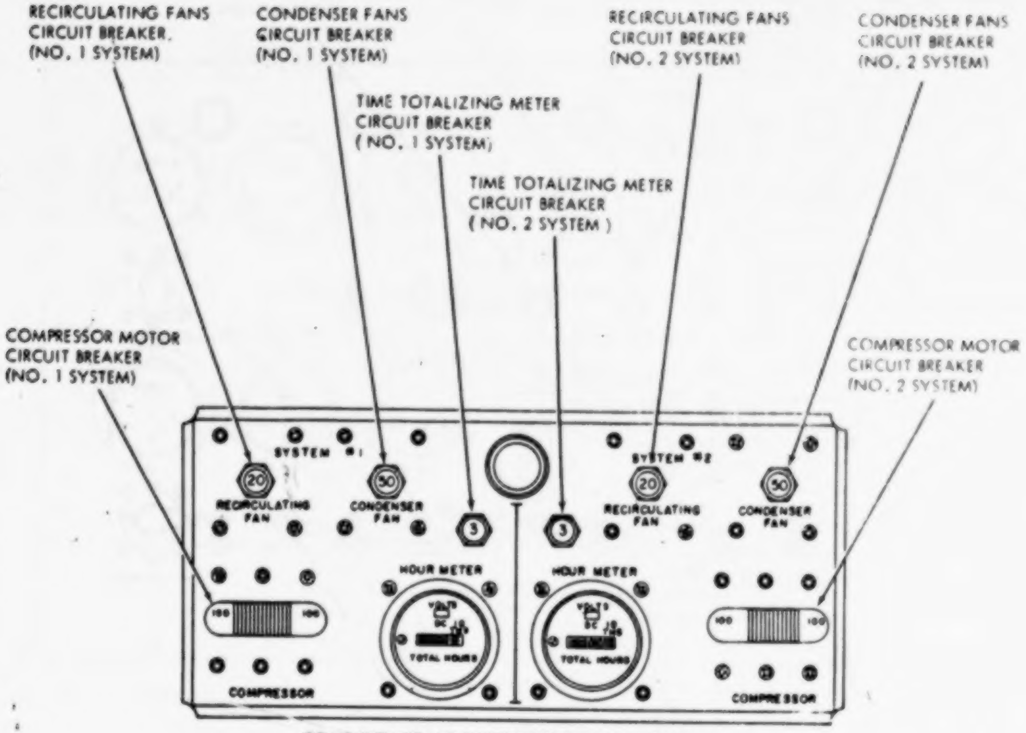
STEP 6. OBSERVE THAT FREQUENCY INDICATED ON FREQUENCY METER IS 400 ± 12 HZ PER SECOND. VOLTAGE AND AMPERAGE OUTPUT MAY BE MONITORED BY POSITIONING VOLT-AMP SELECTOR SWITCH TO APPROPRIATE PHASE AND OBSERVING AC AMMETER AND AC VOLTMETER.

CAUTION: PLACE MAIN CONTACTOR SWITCH IN OPEN POSITION IF 400 HZ ELECTRICAL OUTPUT IS UNATTAINABLE OR ANY OTHER OBVIOUS ELECTRICAL MALFUNCTION OCCURS. REFER TO CHAPTER 3, SECTION IV, TROUBLE-SHOOTING FOR REMEDIAL ACTION.

NOTE: IF 400 HZ POWER IS REQUIRED AT THE 400 HZ CONVENIENCE RECEPTACLES ON THE ELECTRICAL OUTPUT CONNECTION PANEL, PRESS RESET BUTTON ON 400 HZ CONVENIENCE RECEPTACLE CIRCUIT BREAKER IN TO CONNECT CIRCUIT.

ME-5-6115-434-12/2-25

Figure 2-25. Operation to deliver 400 Hz electrical power.


RECIRCULATING FANS CIRCUIT BREAKER (NO. 1 SYSTEM)
CONDENSER FANS CIRCUIT BREAKER (NO. 1 SYSTEM)
TIME TOTALIZING METER CIRCUIT BREAKER (NO. 1 SYSTEM)
TIME TOTALIZING METER CIRCUIT BREAKER (NO. 2 SYSTEM)
RECIRCULATING FANS CIRCUIT BREAKER (NO. 2 SYSTEM)
CONDENSER FANS CIRCUIT BREAKER (NO. 2 SYSTEM)
COMPRESSOR MOTOR CIRCUIT BREAKER (NO. 1 SYSTEM)
COMPRESSOR MOTOR CIRCUIT BREAKER (NO. 2 SYSTEM)
SYSTEM #1
20
RECIRCULATING FAN
50
CONDENSER FAN
3
SYSTEM #2
HOUR METER
VOLTS DC
TOTAL HOURS
100
COMPRESSOR

CONDITIONED AIR SYSTEM CIRCUIT BREAKER PANEL

CAUTION: CONDENSER AIR INLET PANELS AND CONDENSER AIR OUTLET DOORS MUST BE OPEN BEFORE OPERATING THE COOLED AIR SYSTEM.

STEP 1. CHECK THAT CONDITIONED AIR DUCT ASSEMBLIES ARE CONNECTED TO THE POWER UNIT RETURN AIR INLETS, TO THE AIR OUTLETS, AND TO THE POINT OF USE.

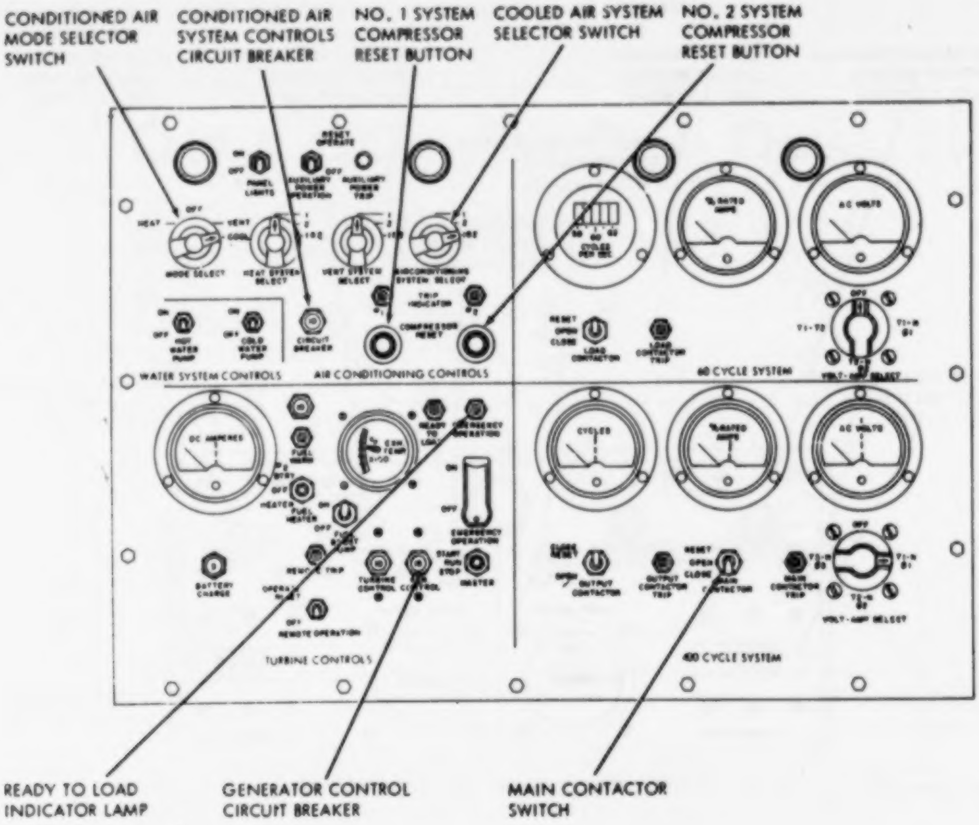
STEP 2. PRESS ALL RESET BUTTONS ON CONDITIONED AIR SYSTEM CIRCUIT BREAKER PANEL IN TO THE RESET POSITION.

ME-5-6115-434-12/2-26①

Figure 2-26. Operation to deliver cooled air (Sheet 1 of 3).

(5) Connect 60 Hz and 400 Hz power cable assemblies from appropriate output receptacles on emergency power transfer electrical kit assembly to point of use.

(6) Connect dc electrical power standby cable assembly (fig. 1-16) to standby operation control connector (fig. 2-3) on the operating power unit and on the standby power unit.


CONDITIONED AIR MODE SELECTOR SWITCH
CONDITIONED AIR SYSTEM CONTROLS CIRCUIT BREAKER
NO. 1 SYSTEM COMPRESSOR RESET BUTTON
COOLED AIR SYSTEM SELECTOR SWITCH
NO. 2 SYSTEM COMPRESSOR RESET BUTTON
WATER SYSTEM CONTROLS
AIR CONDITIONING CONTROLS
60 CYCLE SYSTEM
TURBINE CONTROLS
400 CYCLE SYSTEM
READY TO LOAD INDICATOR LAMP
GENERATOR CONTROL CIRCUIT BREAKER
MAIN CONTACTOR SWITCH

STEP 3. CHECK THAT READY TO LOAD INDICATOR LAMP IS ILLUMINATED INDICATING THAT ENGINE IS READY FOR LOAD.

STEP 4. CHECK THAT GENERATOR CONTROL CIRCUIT BREAKER IS PRESSED IN TO THE RESET POSITION.

STEP 5. MOMENTARILY PLACE MAIN CONTACTOR SWITCH IN RESET POSITION THEN PLACE SWITCH IN CLOSE POSITION.

STEP 6. PLACE COOLED AIR SYSTEM SELECTOR SWITCH IN POSITION FOR THE SYSTEM TO BE OPERATED, SYSTEM 1, SYSTEM 2 OR SYSTEMS 1 & 2 TOGETHER.

STEP 7. PRESS RESET BUTTON ON CONDITIONED AIR SYSTEM CONTROLS CIRCUIT BREAKER IN TO RESET POSITION.

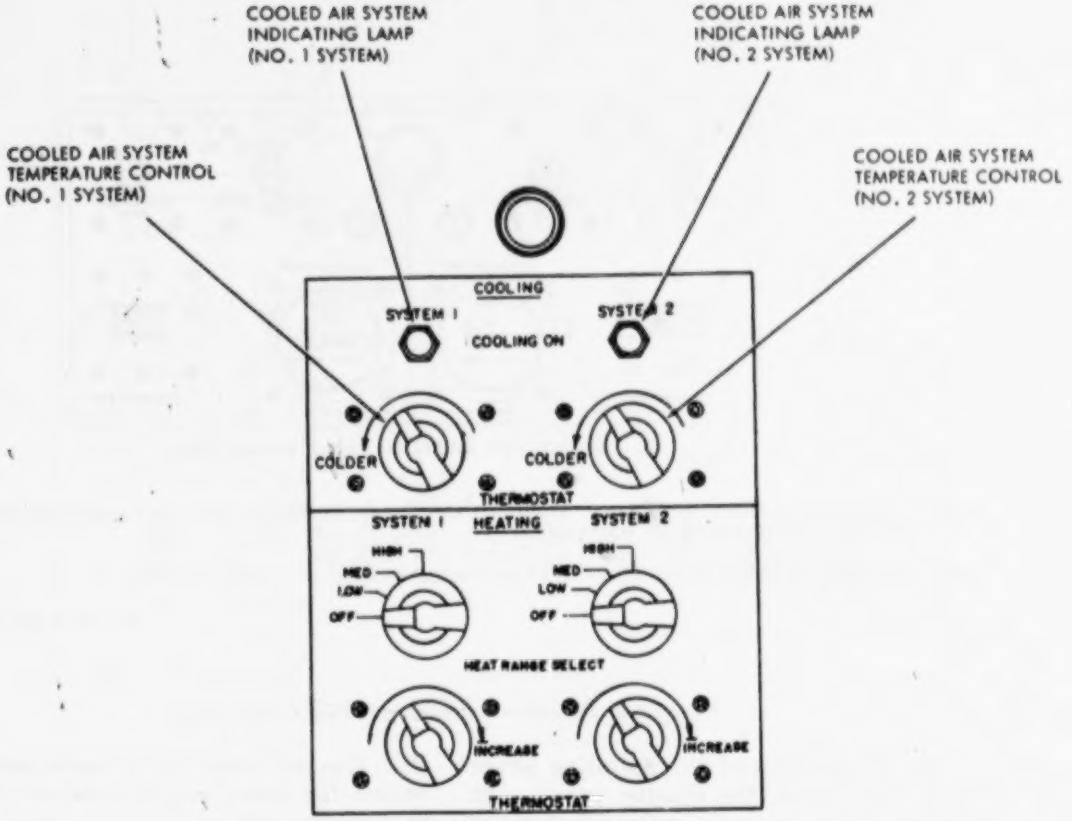
STEP 8. PRESS APPLICABLE SYSTEM OR BOTH COMPRESSOR RESET BUTTONS IN TO RESET POSITION IF TRIP INDICATOR LAMP IS ILLUMINATED.

STEP 9. PLACE CONDITIONED AIR MODE SELECTOR SWITCH TO COOL POSITION. REFER TO STEPS 10 AND 11 FOR TEMPERATURE ADJUSTMENT.

CAUTION: PLACE MAIN CONTACTOR SWITCH IN OPEN POSITION AND CONDITIONED AIR MODE SELECTOR SWITCH IN OFF POSITION IF COOLED AIR SYSTEM FAILS TO OPERATE OR ANY OTHER OBVIOUS MALFUNCTION OCCURS. REFER TO CHAPTER 3, SECTION IV, TROUBLESHOOTING FOR REMEDIAL ACTION.

ME-5-6115-434-12/2-26②

Figure 2-26. Operation to deliver cooled air (Sheet 2 of 2).


COOLED AIR SYSTEM INDICATING LAMP (NO. 1 SYSTEM)
COOLED AIR SYSTEM INDICATING LAMP (NO. 2 SYSTEM)
COOLED AIR SYSTEM TEMPERATURE CONTROL (NO. 1 SYSTEM)
COOLED AIR SYSTEM TEMPERATURE CONTROL (NO. 2 SYSTEM)
COOLING
SYSTEM 1
SYSTEM 2
COOLING ON
COLDER
COLDER
THERMOSTAT
SYSTEM 1
HEATING
SYSTEM 2
HIGH
MED
LOW
OFF
HIGH
MED
LOW
OFF
HEAT RANGE SELECT
INCREASE
INCREASE
THERMOSTAT

TEMPERATURE CONTROL PANEL

STEP 10. OBSERVE THAT APPLICABLE COOLED AIR SYSTEM INDICATING LAMP IS ILLUMINATED INDICATING THAT ONE OR BOTH COOLED AIR SYSTEM TEMPERATURE CONTROLS IS CALLING FOR COOLING.

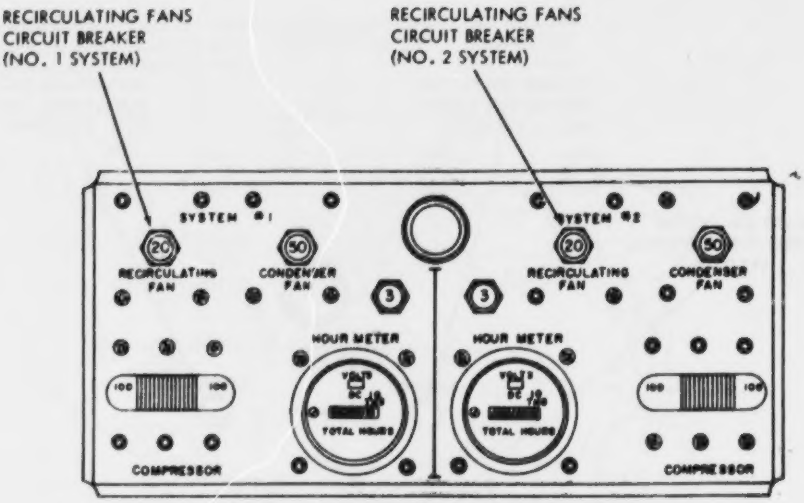
STEP 11. ADJUST APPROPRIATE COOLED AIR SYSTEM TEMPERATURE CONTROL AS REQUIRED. ROTATE CONTROL COUNTERCLOCKWISE TO DECREASE TEMPERATURE AND CLOCKWISE TO INCREASE TEMPERATURE.

ME-5-6115-434-12/2-26③

Figure 2-26. Operation to deliver cooled air (Sheet 3 of 3).

Note. Operating power unit must be running and 60 Hz load contactor switch and 400 Hz output contactor switch must be CLOSED prior to connecting dc electrical power standby cable assembly to operating power unit.

Note. Use adapter cable assembly provided with Electrical Kit assembly to interconnect standby cable assemblies if additional length is required.


RECIRCULATING FANS CIRCUIT BREAKER (NO. 1 SYSTEM)
RECIRCULATING FANS CIRCUIT BREAKER (NO. 2 SYSTEM)
SYSTEM #1
SYSTEM #2
20
RECIRCULATING FAN
50
CONDENSER FAN
3
HOUR METER
VOLTS DC
TOTAL HOURS
100
COMPRESSOR

CONDITIONED AIR SYSTEM CIRCUIT BREAKER PANEL

STEP 1. CHECK THAT CONDITIONED AIR DUCT ASSEMBLIES ARE CONNECTED TO THE POWER UNIT RETURN AIR INLETS, TO THE AIR OUTLETS, AND TO THE POINT OF USE.

STEP 2. PRESS RESET BUTTONS ON RECIRCULATING FANS CIRCUIT BREAKERS IN TO RESET POSITION.

ME-5-6115-434-12/2-27 ①

Figure 2-27. Operation to deliver heated air (Sheet 1 of 3).

(7) If operation of the operating power unit is interrupted, the standby power unit will start automatically to continue delivery of 60 Hz and 400 Hz electrical power.

Note. To shut down standby power unit, disconnect the dc electrical standby cable assembly from both power units and place 400 Hz main contactor switch in OPEN position.

k. Remote Operation to Deliver Ventilating Air. When ventilating air is the only requirement from a power unit, the necessary 400 Hz electrical power for operating the recirculating fans may be taken from another operating power unit. A total of two power unit ventilating air systems may be operated by 400 Hz power from one operating power unit. If remote operation of ventilating air system is required connect power units as follows.

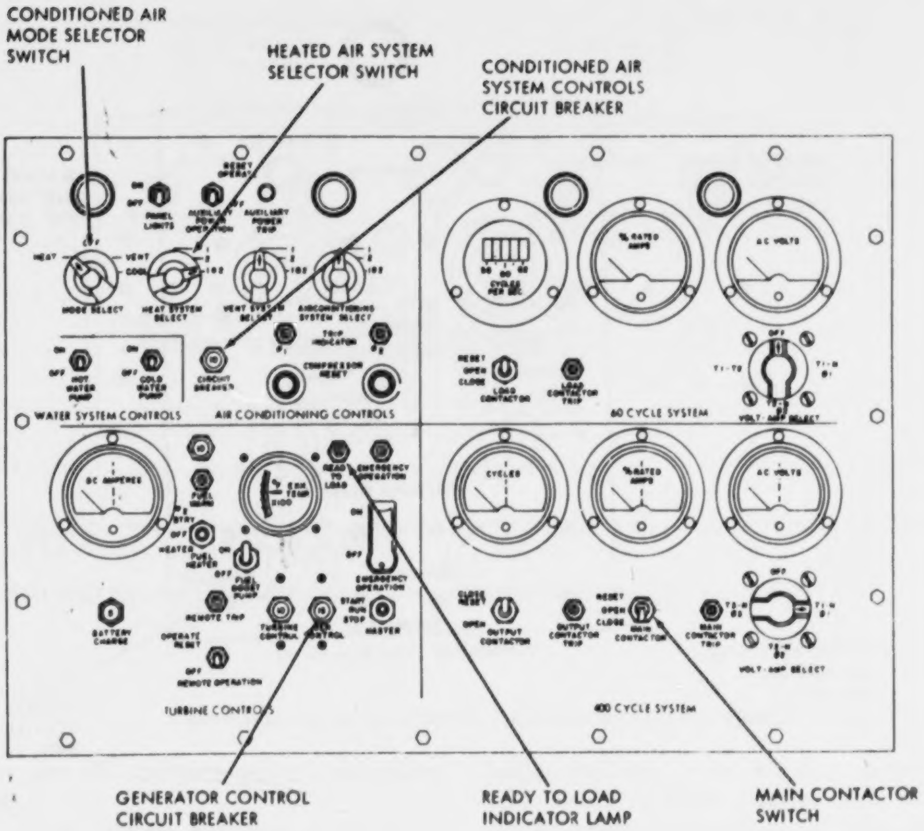
(1) Connect 400 Hz remote power cable assembly (fig. 1-16) to remote fan power input receptacle (fig. 2-3) on non-operating unit. Connect other end of cable assembly to remote fan power output connector (fig. 2-3) on operating unit.

(2) Place ventilating system selector switch (fig. 2-16) on non-operating unit in desired system position to operate system no. 1, system no. 2, or systems 1 and 2 together.

(3) Place conditioned air mode selector switch (fig. 2-16) on non-operating unit in VENT or OFF position.

(4) Place remote operation switch (fig. 2-14) on operating power unit in OPERATE RESET position then release switch. Place remote operation switch (fig. 2-14) on non-operating power unit in OPERATE RESET position then release switch.

(5) When ventilating air from the non-operating power unit is no longer required, place remote operation switch (fig. 2-14) on both power units in the OFF position and disconnect the power cables.


CONDITIONED AIR MODE SELECTOR SWITCH
HEATED AIR SYSTEM SELECTOR SWITCH
CONDITIONED AIR SYSTEM CONTROLS CIRCUIT BREAKER
WATER SYSTEM CONTROLS
AIR CONDITIONING CONTROLS
60 CYCLE SYSTEM
TURBINE CONTROLS
400 CYCLE SYSTEM
GENERATOR CONTROL CIRCUIT BREAKER
READY TO LOAD INDICATOR LAMP
MAIN CONTACTOR SWITCH

STEP 3. CHECK THAT READY TO LOAD INDICATOR LAMP IS ILLUMINATED INDICATING THAT ENGINE IS READY FOR LOAD.

STEP 4. CHECK THAT GENERATOR CONTROL CIRCUIT BREAKER IS PRESSED IN TO THE RESET POSITION.

STEP 5. MOMENTARILY PLACE MAIN CONTACTOR SWITCH IN RESET POSITION THEN PLACE SWITCH IN CLOSE POSITION.

STEP 6. PLACE HEATED AIR SYSTEM SELECTOR SWITCH IN POSITION FOR THE SYSTEM TO BE OPERATED, SYSTEM 1, SYSTEM 2, OR SYSTEMS 1 & 2 TOGETHER.

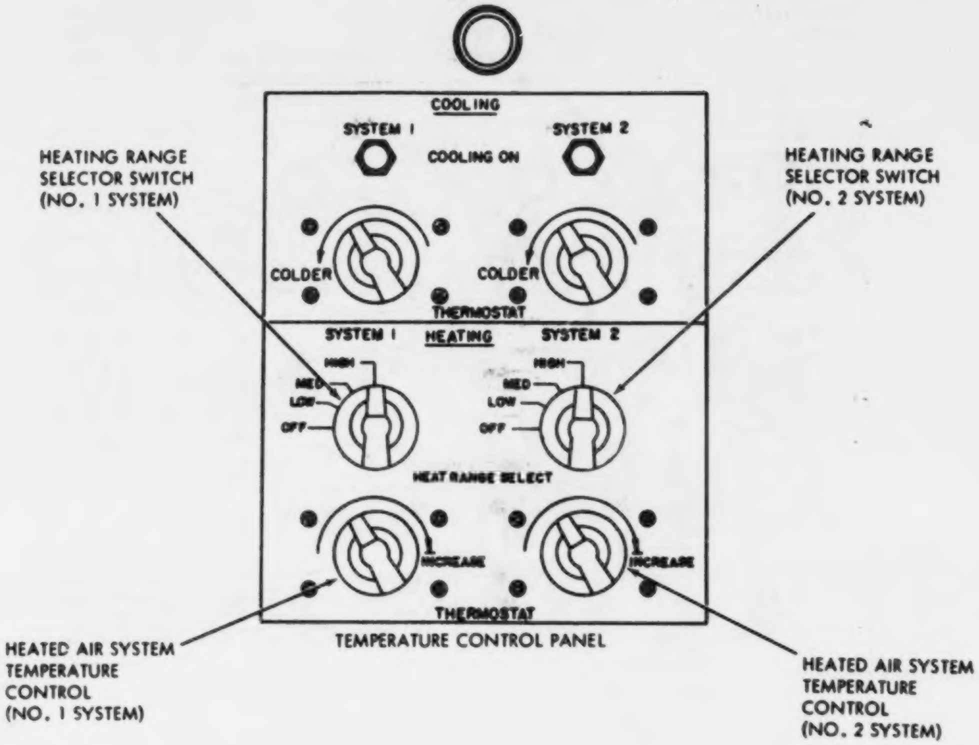
STEP 7. PRESS RESET BUTTON ON CONDITIONED AIR SYSTEM CONTROLS CIRCUIT BREAKER IN TO RESET POSITION.

STEP 8. PLACE CONDITIONED AIR MODE SELECTOR SWITCH TO HEAT POSITION. REFER TO STEPS 9 AND 10 FOR TEMPERATURE ADJUSTMENT.

CAUTION: PLACE MAIN CONTACTOR SWITCH IN OPEN POSITION AND CONDITIONED AIR MODE SELECTOR SWITCH IN OFF POSITION IF HEATED AIR SYSTEM FAILS TO OPERATE OR ANY OTHER OBVIOUS MALFUNCTION OCCURS. REFER TO CHAPTER 3, SECTION IV, TROUBLESHOOTING FOR REMEDIAL ACTION.

ME-5-6115-434-12/2-27 ②

Figure 2-27. Operation to deliver heated air (Sheet 2 of 3).


COOLING
SYSTEM 1
SYSTEM 2
COOLING ON
HEATING RANGE SELECTOR SWITCH (NO. 1 SYSTEM)
HEATING RANGE SELECTOR SWITCH (NO. 2 SYSTEM)
COLDER
COLDER
THERMOSTAT
SYSTEM 1
HEATING
SYSTEM 2
HIGH
MED
LOW
OFF
HIGH
MED
LOW
OFF
HEAT RANGE SELECT
INCREASE
INCREASE
THERMOSTAT
TEMPERATURE CONTROL PANEL
HEATED AIR SYSTEM TEMPERATURE CONTROL (NO. 1 SYSTEM)
HEATED AIR SYSTEM TEMPERATURE CONTROL (NO. 2 SYSTEM)

STEP 9. POSITION APPLICABLE HEATING RANGE SELECTOR SWITCH IN THE DESIRED HEATING RANGE (LOW, MED, OR HIGH).

STEP 10. ADJUST APPROPRIATE HEATED AIR SYSTEM TEMPERATURE CONTROL AS REQUIRED FOR TEMPERATURE ADJUSTMENT WITHIN THE SELECTED HEATING RANGE. ROTATE CONTROL CLOCKWISE TO INCREASE TEMPERATURE AND COUNTERCLOCKWISE TO DECREASE TEMPERATURE.

ME-5-6115-434-12/2-27③

Figure 2-27. Operation to deliver heated air (Sheet 3 of 3).

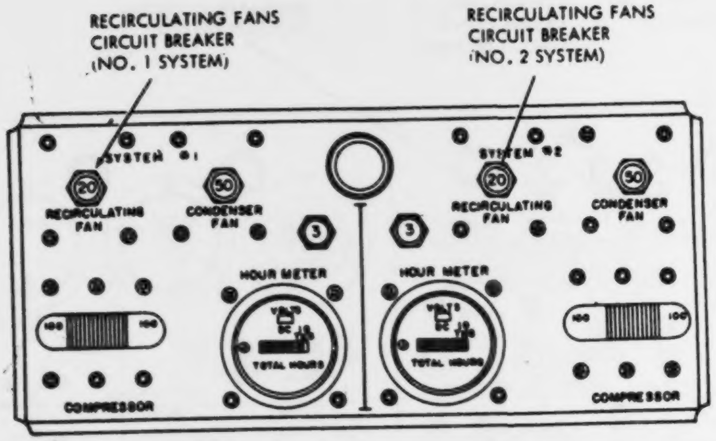
l. Operation to Deliver Auxiliary 400 Hz Power. If additional 400 Hz electrical power is required from the power unit, connect and operate the power unit as follows.

Note. The conditioned air system is not operable during auxiliary 400 Hz power output.

(1) Connect 400 Hz electrical power output cable assembly (fig. 1-16) to 400 Hz auxiliary power receptacles (fig. 2-3) and to point of use.

(2) Operate power unit for delivery of 400 Hz power as described in paragraph 2-16*b*.

(3) Place auxiliary power switch (fig. 2-16) in RESET OPERATE position. Power unit will deliver additional 400 Hz power


RECIRCULATING FANS
CIRCUIT BREAKER
(NO. 1 SYSTEM)
RECIRCULATING FANS
CIRCUIT BREAKER
(NO. 2 SYSTEM)
SYSTEM #1
20
RECIRCULATING FAN
50
CONDENSER FAN
3
HOUR METER
VOLTS DC
TOTAL HOURS
100
100
COMPRESSOR
SYSTEM #2
20
RECIRCULATING FAN
50
CONDENSER FAN
3
HOUR METER
VOLTS DC
TOTAL HOURS
100
100
COMPRESSOR

CONDITIONED AIR SYSTEM CIRCUIT BREAKER PANEL

STEP 1. CHECK THAT CONDITIONED AIR DUCT ASSEMBLIES ARE CONNECTED TO THE POWER UNIT RETURN AIR INLETS, TO THE AIR OUTLETS, AND TO POINT OF USE.

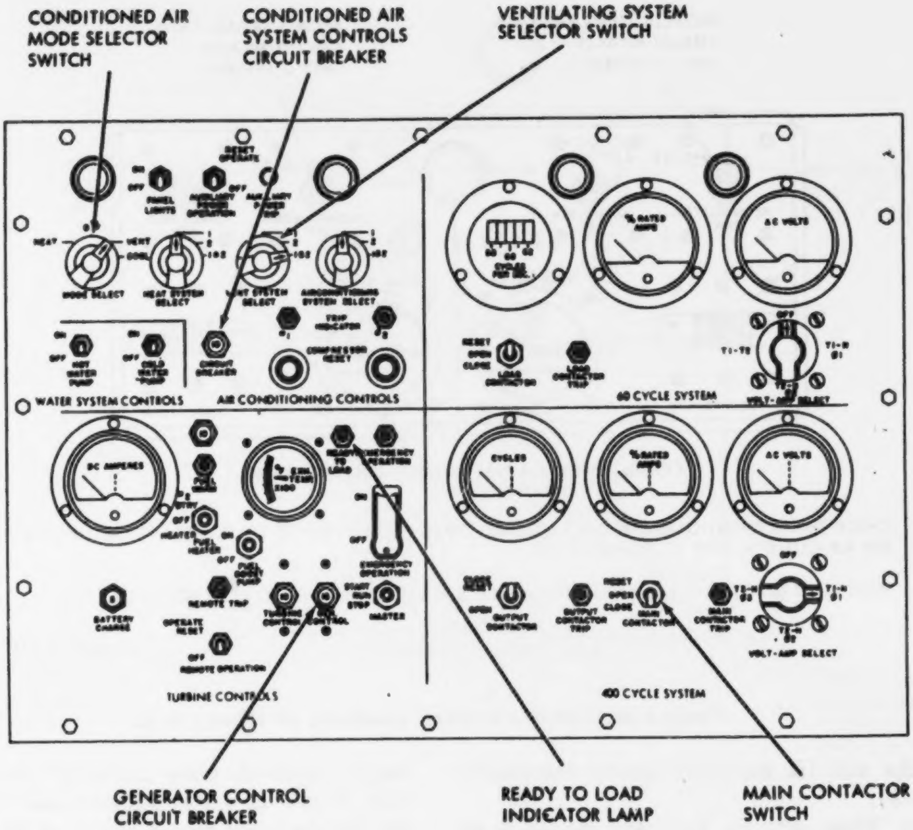
STEP 2. PRESS RESET BUTTONS ON RECIRCULATING FANS CIRCUIT BREAKERS IN TO RESET POSITION.

ME-5-6115-434-12/2-28 ①

Figure 2-28. Operation to deliver ventilating air (Sheet 1 of 2).

from the 400 Hz auxiliary power receptacles (fig. 2-3).

(4) When 400 Hz auxiliary power is no longer required, place auxiliary power switch (fig. 2-16) in OFF position and disconnect 400 Hz electrical power output cable assembly.


CONDITIONED AIR MODE SELECTOR SWITCH
CONDITIONED AIR SYSTEM CONTROLS CIRCUIT BREAKER
VENTILATING SYSTEM SELECTOR SWITCH
WATER SYSTEM CONTROLS
AIR CONDITIONING CONTROLS
60 CYCLE SYSTEM
DC AMPERES
CYCLES
AC VOLTS
TURBINE CONTROLS
400 CYCLE SYSTEM
VOLT-AMP SELECT
GENERATOR CONTROL CIRCUIT BREAKER
READY TO LOAD INDICATOR LAMP
MAIN CONTACTOR SWITCH

STEP 3. CHECK THAT READY TO LOAD INDICATOR LAMP IS ILLUMINATED INDICATING THAT ENGINE IS READY FOR LOAD.

STEP 4. CHECK THAT GENERATOR CONTROL CIRCUIT BREAKER IS PRESSED IN TO THE RESET POSITION.

STEP 5. MOMENTARILY PLACE MAIN CONTACTOR SWITCH IN RESET POSITION THEN PLACE SWITCH IN CLOSE POSITION.

STEP 6. PLACE VENTILATING SYSTEM SELECTOR SWITCH IN POSITION FOR THE SYSTEM TO BE OPERATED, SYSTEM 1, SYSTEM 2, OR SYSTEMS 1 & 2 TOGETHER.

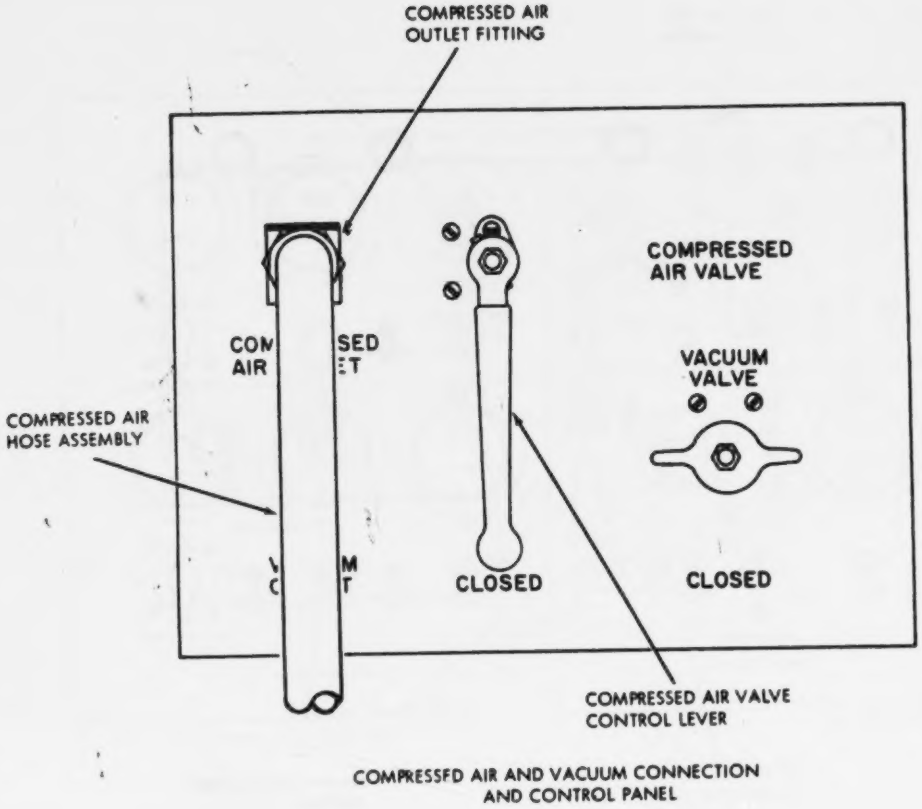
STEP 7. PRESS RESET BUTTON ON CONDITIONED AIR SYSTEM CONTROLS CIRCUIT BREAKER IN TO RESET POSITION.

STEP 8. PLACE CONDITIONED AIR MODE SELECTOR SWITCH IN VENT POSITION.

CAUTION: PLACE MAIN CONTACTOR SWITCH IN OPEN POSITION AND CONDITIONED AIR MODE SELECTOR SWITCH IN OFF POSITION IF VENTILATING AIR SYSTEM FAILS TO OPERATE OR ANY OTHER OBVIOUS MALFUNCTION OCCURS. REFER TO CHAPTER 3, SECTION IV, TROUBLESHOOTING FOR REMEDIAL ACTION.

ME-5-6115-434-12/2-28 ②

Figure 2-28. *Operation to deliver ventilating air (Sheet 2 of 2).*


COMPRESSED AIR
OUTLET FITTING
COMPRESSED
AIR VALVE
COM SED
AIR ET
VACUUM
VALVE
COMPRESSED AIR
HOSE ASSEMBLY
V M
(T
CLOSED
CLOSED
COMPRESSED AIR VALVE
CONTROL LEVER
COMPRESSFD AIR AND VACUUM CONNECTION
AND CONTROL PANEL

STEP 1. CHECK THAT COMPRESSED AIR HOSE ASSEMBLY IS SECURELY CONNECTED TO COMPRESSED AIR OUTLET FITTING AND TO POINT OF USE.

STEP 2. CHECK THAT READY TO LOAD INDICATOR LAMP IS ILLUMINATED INDICATING THAT ENGINE IS READY FOR LOAD.

STEP 3. ROTATE COMPRESSED AIR VALVE CONTROL LEVER COUNTERCLOCKWISE TO DELIVER COMPRESSED AIR.

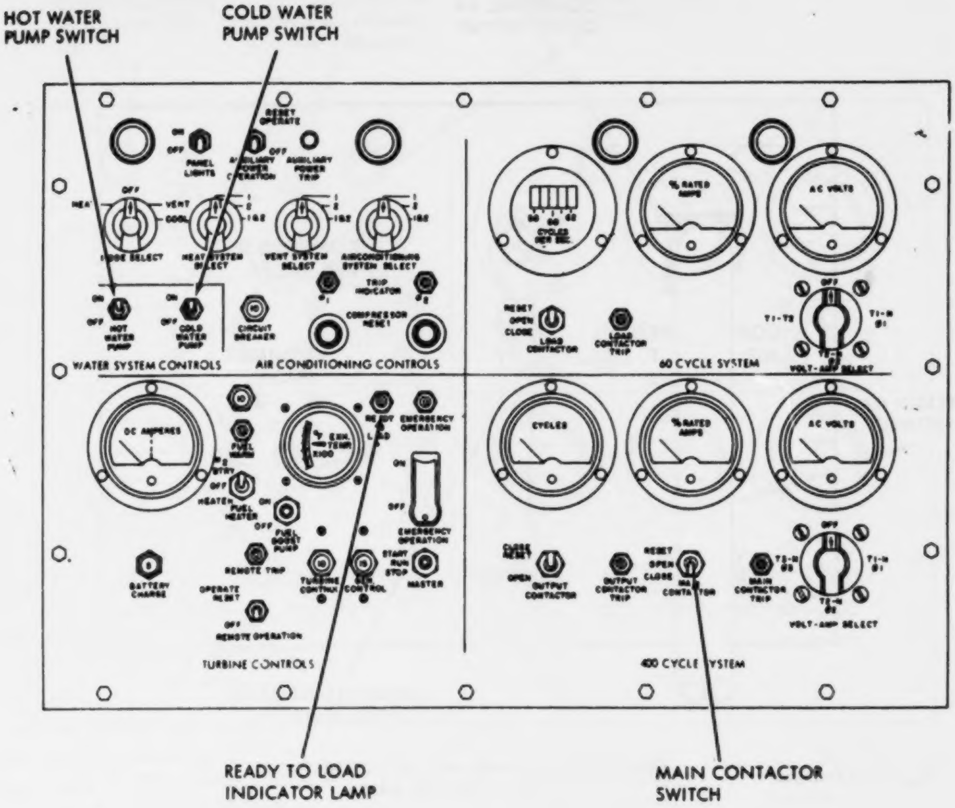
NOTE:

ROTATE CONTROL LEVER SLOWLY TO OBTAIN SMOOTH COMPRESSED AIR DELIVERY.

STEP 4. PLACE CONTROL LEVER IN THE CLOSED POSITION TO STOP COMPRESSED AIR DELIVERY.

ME-5-6115-434-12/2-29

Figure 2-29. Operation to deliver compressed air.


HOT WATER PUMP SWITCH
COLD WATER PUMP SWITCH
WATER SYSTEM CONTROLS
AIR CONDITIONING CONTROLS
60 CYCLE SYSTEM
TURBINE CONTROLS
400 CYCLE SYSTEM
READY TO LOAD INDICATOR LAMP
MAIN CONTACTOR SWITCH

STEP 1. CHECK THAT DUAL WATER HOSE ASSEMBLY IS SECURELY CONNECTED TO WATER INLET AND OUTLET CONNECTION PANEL AND TO POINT OF USE. CHECK THAT HOT WATER VALVE AND COLD WATER VALVE ARE IN THE OFF POSITION.

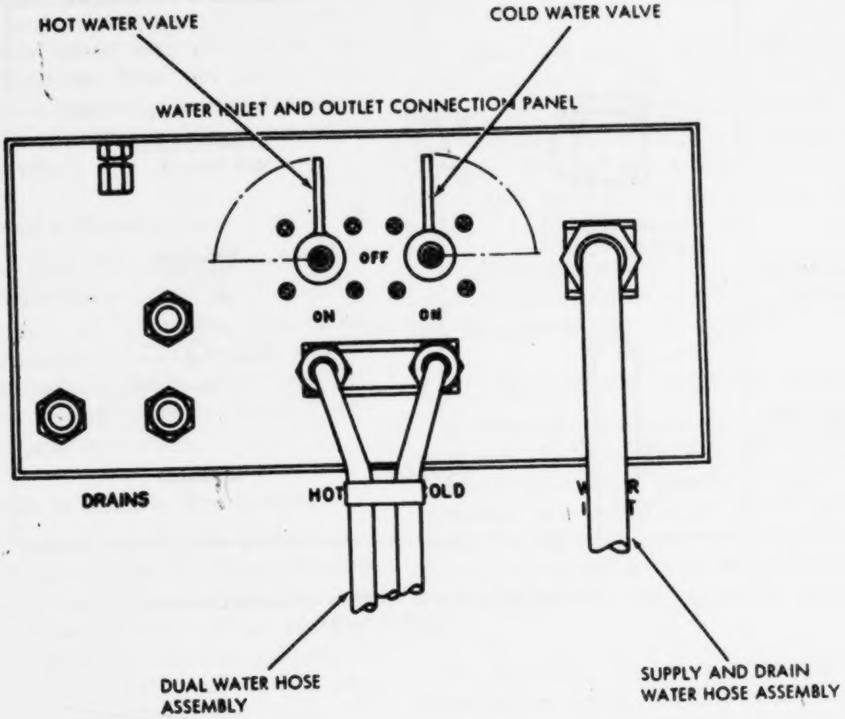
STEP 2. CHECK THAT READY TO LOAD INDICATOR LAMP IS ILLUMINATED INDICATING THAT ENGINE IS READY FOR LOAD.

STEP 3. MOMENTARILY PLACE MAIN CONTACTOR SWITCH IN RESET POSITION THEN PLACE SWITCH IN CLOSE POSITION.

STEP 4. PLACE HOT WATER PUMP SWITCH AND COLD WATER PUMP SWITCH IN ON POSITION.

ME-5-6115-434-12/2-30①

Figure 2-30. Operation to deliver hot and cold water (Sheet 1 of 2).


HOT WATER VALVE
COLD WATER VALVE
WATER INLET AND OUTLET CONNECTION PANEL
OFF
ON
ON
DRAINS
HOT
COLD
DUAL WATER HOSE ASSEMBLY
SUPPLY AND DRAIN WATER HOSE ASSEMBLY

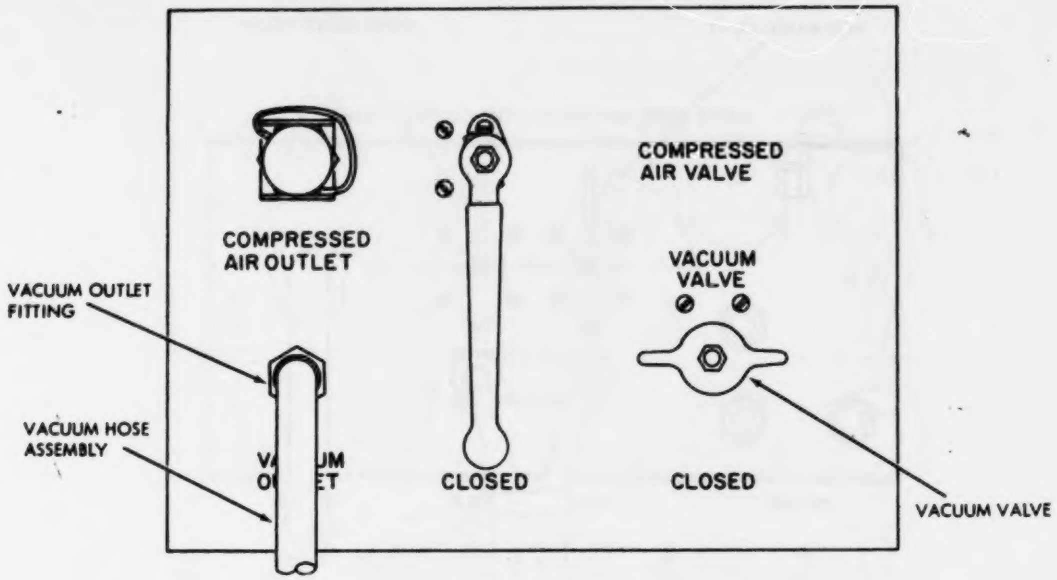
STEP 5. PLACE HOT WATER VALVE AND COLD WATER VALVE IN ON POSITION.

CAUTION: IF WATER DELIVERY IS UNATTAINABLE OR ANY OTHER OBVIOUS MALFUNCTION OCCURS, PLACE PUMP SWITCHES ON INSTRUMENT PANEL IN OFF POSITION AND PLACE HOT WATER VALVE AND COLD WATER VALVE IN OFF POSITION. REFER TO CHAPTER 3, SECTION IV, TROUBLESHOOTING FOR REMEDIAL ACTION.

NOTE: APPROXIMATELY 15 MINUTES IS REQUIRED FOR HEATING THE HOT WATER.

ME-5-6115-434-12/2-30②

Figure 2-30. Operation to deliver hot and cold water (Sheet 2 of 2).


COMPRESSED AIR OUTLET
COMPRESSED AIR VALVE
VACUUM VALVE
VACUUM OUTLET FITTING
VACUUM HOSE ASSEMBLY
CLOSED
CLOSED
VACUUM VALVE

COMPRESSED AIR AND VACUUM CONNECTION AND CONTROL PANEL

STEP 1. CHECK THAT VACUUM HOSE ASSEMBLY IS SECURELY CONNECTED TO VACUUM OUTLET FITTING AND TO POINT OF USE.

STEP 2. CHECK THAT READY TO LOAD INDICATOR LAMP IS ILLUMINATED INDICATING THAT ENGINE IS READY FOR LOAD.

STEP 3. ROTATE VACUUM VALVE TO PROVIDE SUCTION.

STEP 4. WHEN SUCTION IS NO LONGER REQUIRED, ROTATE VACUUM VALVE TO CLOSED POSITION.

ME-5-6115-434-12/2-31

Figure 2-31. Operation to provide vacuum suction.

Section V. OPERATION UNDER UNUSUAL CONDITIONS

2-17. Operation in Extreme Cold

a. The power unit will operate satisfactorily at ambient temperatures as low as -25°F. However, special precautions should be observed for the water system and the batteries. Operating fuel should be used that is compatable to the low temperatures (para 1-4*b*(2)(*a*)) and precautions should be taken to prevent accumulation of moisture in the fuel supply.

b. If operation of the power unit is to be discontinued for longer than 15 minutes during cold conditions, drain and dry the water system as described in paragraph 2-4*a*(3).

c. Keep Batteries fully charged at all times.

Caution: **Operate the power unit for at least 1 hour after adding water to batteries. Water added to batteries may freeze unless it is immediately mixed with electrolyte. Remove frozen batteries from the power unit immediately upon discovery to avoid damage caused by leaking from cracked cases when the battery thaws.**

2-18. Operation in Extreme Heat

a. The power unit will operate satisfactorily at ambient temperatures up to 125°F (52°C).

b. The operation of the power unit in extreme heat increases the evaporation rate of water from the battery electrolyte. Check battery electrolyte level frequently (para 2-1*b*) during extreme heat conditions.

2-19. Operation in Dusty or Sandy Areas

a. Erect protective shield for power unit. Dust and sand shorten life of equipment parts and cause mechanical failure. Utilize natural barriers. Wipe down power unit at frequent intervals using approved cleaning solvent. If water is plentiful, wet down surrounding area beyond immediate operating areas.

b. Lubricate power unit in accordance with lubrication order. Clean oil fill and level cap and area around oil tank fill opening frequently to prevent dust and abrasive material from entering engine.

c. Keep fuel supply tank cap tightly closed to prevent dust and sand from entering tank. Clean area around fuel supply tank cap before removing cap to add fuel. Service fuel filters frequently (para 3-17 and 3-18).

d. Inspect and clean collector box on engine air inlet filter daily.

e. Keep all doors and panels on the power unit closed as much as possible.

2-20. Operation Under Rainy or Humid Conditions

a. The power unit is weatherized to operate satisfactorily under rainy or humid conditions. However, precautions should be observed to insure protection of the equipment from excessive moisture.

b. Secure all panels and doors on power unit to minimize admittance of moisture to power unit components.

c. Close and secure instrument panel access door (fig. 1-1) after power unit has been started and adjusted for operation to prevent accumulation of moisture on instruments and controls. Remove excess moisture from instrument and control panels with a clean, dry cloth.

d. When power unit is not operating, cover unit with a tarpaulin or other protective covering to prevent entry of moisture.

2-21. Operation in Salt Water Areas

a. Wash down exterior of power unit regularly with fresh water. Avoid directing a water hose or other high pressure water source at openings into interior of power unit. Wash down fins on condensers and evaporators from the inside to the outside. Wipe down internal components with an approved cleaning solvent.

b. Carefully inspect components for evidence of corrosion and deterioration of insulation. Inspect all painted surfaces for cracked, peeled, or blistered paint. Coat all exposed surfaces with an approved corrosion preventive paint. Report severe corrosion damage to direct support maintenance.

2-22. Operation in Snow

a. The power unit will operate satisfactorily during snow conditions. However precautions should be taken to prevent accumulation of snow at the power unit.

b. Observe precedures described for operation in extreme cold (para 2-17).

c. Erect suitable barriers to prevent air inlet and exhaust openings from being clogged by driven snow.

Caution: **Barriers must not block the air flow during operation.**

d. Prevent snow from collecting around access panels and doors so as to prevent opening.

2-23. Operation in Mud

a. The power unit will operate satisfactorily in mud provided sufficient support is provided the skids from sinking to the point that mud blocks the various fuel and moisture drains in the bottom of the enclosure.

b. The power unit should be inspected frequently to insure that mud has not plugged any drains, fittings or other openings.

c. Boards or other suitable support material should be placed around the power unit to provide solid, dry surfaces for personnel operating and servicing the power unit.

2-24. Operation at High Altitudes

The power unit will operate satisfactorily at altitudes up to 10,000 feet.

2-25. Operation Below Sea Level

The power unit will operate satisfactorily below sea level.

Section VI. OPERATION OF AUXILIARY MATERIAL USED IN CONJUNCTION WITH THE EQUIPMENT

2-26. General

The power unit is equipped with a 2 3/4 pound dry charge fire extinguisher, bracket mounted on the remote power connection panel (fig. 2-3). The extinguisher, charged with purple-K dry chemical, is suitable for all type fires. A squeeze of the trigger breaks the seal disc in the top of the pressurized dry chemical shell and starts the discharge. When trigger is released, discharge stops, permitting intermittent discharge. Once seal disc is broken, valve will hold pressure in shell only for a few hours. After using, replace with a new shell immediately.

2-27. Fire Extinguisher

a. Use. To use the fire extinguisher, point the nozzle at the base of the flame and squeeze trigger. Apply chemical until all signs of fire have been extinguished.

b. Recharging. Recharge immediately after using. Squeeze trigger to vent pressure. Unscrew and discard used shell. Remove dry chemical remaining in head. Insert new indicator tab into trigger. Screw new shell firmly into head. Insert new indicator tab into control head.

c. Maintenance. Semiannually, unscrew shell from head. Be sure trigger works freely and nozzle is clean. Follow maintenance instructions on shell. Insert new indicator into trigger. Screw shell firmly into head. Insert new indicator into control head.

CHAPTER 3

OPERATOR AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. OPERATOR'S AND ORGANIZATIONAL MAINTENANCE REPAIR PARTS, TOOLS, AND EQUIPMENT

3-1. Tools and Equipment

a. Basic issue tools and repair parts issued with or authorized for the power unit are listed in the Basic Issue Items List, appendix B of this manual.

b. The special tools and equipment required to perform operator's and organizational maintenance on the power unit are listed in table 3-1 and appendix B. References and illustrations indicating the use of these tools and equipment are listed in the table. The five-digit number preceding the stock number is the Federal supply code number for the manufacturer of the tools and equipment. No special tools or equipment are required by operator for performing maintenance on the power unit. All maintenance on the power unit is accomplished by organizational maintenance personnel.

3-2. Organizational Maintenance Repair Parts

Organizational maintenance repair parts are listed and illustrated in TM 5-6115-434-20P (When printed).

Section II. LUBRICATION

3-3. General Lubrication Information

a. This section contains lubrication instructions which are supplemental to, and not specifically covered in the lubrication order.

b. The lubrication order is an exact reproduction of the approved lubrication order. Refer to LO 5-6115-434-12.

Table 3-1. Special Tools and Equipment

Item	FSN (if applicable) or part no.	Para No.	Use
Screwdriver and wrench assembly	5120-668-6122	3-8	Adjustment of fuel control governor and acceleration limiter valve.
Analyzer: gas turbine engine	4920-778-6091	3-8	Check and adjustment of engine operation and components.
Cable: branched electrical special purpose	(99193) 284692-1-1	3-8	Connect analyzer to gas turbine engine.
Sling: multiple leg	(99193) 284693-1-1	2-4	Hoisting power unit.

Figure 3-1. Not used.

3-4. Detailed Lubrication Information

a. General. Keep all lubricants in closed containers and store in clean, dry place away from extreme heat. Allow no dust, dirt, or other foreign material to mix with lubricants. Keep all lubrication equipment clean and ready to use. Clean lubrication equipment before and after use.

b. Cleaning. Keep all external parts not requiring lubrication clean of lubricants. Before lubricating equipment, wipe all lubrication points free of dirt and grease. Clean all lubrication points after lubricating to prevent accumulation of foreign matter.

c. Changing Oil.

Note. Drain oil while engine is still hot from operation. If necessary, start and operate engine until oil is hot, then shut down engine and proceed with oil change while oil is hot.

(1) Open oil tank access door (fig. 1-1). Loosen oil tank filler cap and dipstick to vent tank and facilitate draining. Remove oil drain cap and allow oil to drain completely.

Note. Inspect drained oil for metal particles which might indicate internal damage to engine. Notify direct support maintenance if oil contains metal particles.

(2) Remove gas turbine engine power plant access panel (fig. 1-2). Remove oil filter housing, filter element, and packings from oil pump assembly. (See fig. 3-2.) Clean oil filter housing with an approved dry-cleaning solvent and dry thoroughly.

(3) Install new filter element, new packings, and cleaned oil filter housing on oil pump assembly.

(4) Install oil drain cap. Remove filler cap and dipstick from oil tank and fill oil tank with specified lubricating oil until dipstick indicates FULL. Allow time for oil level to recede as air is vented, then add oil until level remains at FULL mark on dipstick. Reinstall oil tank filler cap and dipstick.

***Caution:* Do not mix oils from different manufacturers or different specifications. If changing from one brand of oil or one oil specification to another, flush lubrication system as described in paragraph *d* below.**

Note. Oil level must be checked and oil replenished as required after engine has been started and operated sufficiently to circulate oil.

(5) Reinstall gas turbine engine power plant access panel (fig. 1-2). Close and secure oil tank access door (fig. 1-1).

d. Flushing Lubrication System.

(1) Drain oil and change filter as described in steps *c*(1), (2), (3) above.

(2) Disconnect plumbing lines from oil pump assembly and from oil tank assembly to oil temperature regulator (oil cooler) and allow oil to drain completely from lines.

(3) Remove oil temperature regulator (para 3-40*a*) and allow to drain completely.

(4) Reinstall oil temperature regulator (para 3-40*b*) and reconnect plumbing lines from oil pump assembly and oil tank assembly.

(5) Fill oil tank as described in step *c*(4) above.

(6) Start engine and allow to operate at no load for approximately five minutes, then shut down engine.

(7) Repeat steps *d*(1) through (5) above.

(8) Start engine and allow to operate at no load for approximately five minutes, then shut down engine.

(9) Replace oil filter element as described in steps *c*(2) and (3).

(10) Check oil level and replenish as required.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

3-5. General

To insure that the power unit is ready for operation at all times, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance checks and services to be performed are listed as described in paragraph 3-6. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit will be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded, together with the corrective action taken, on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

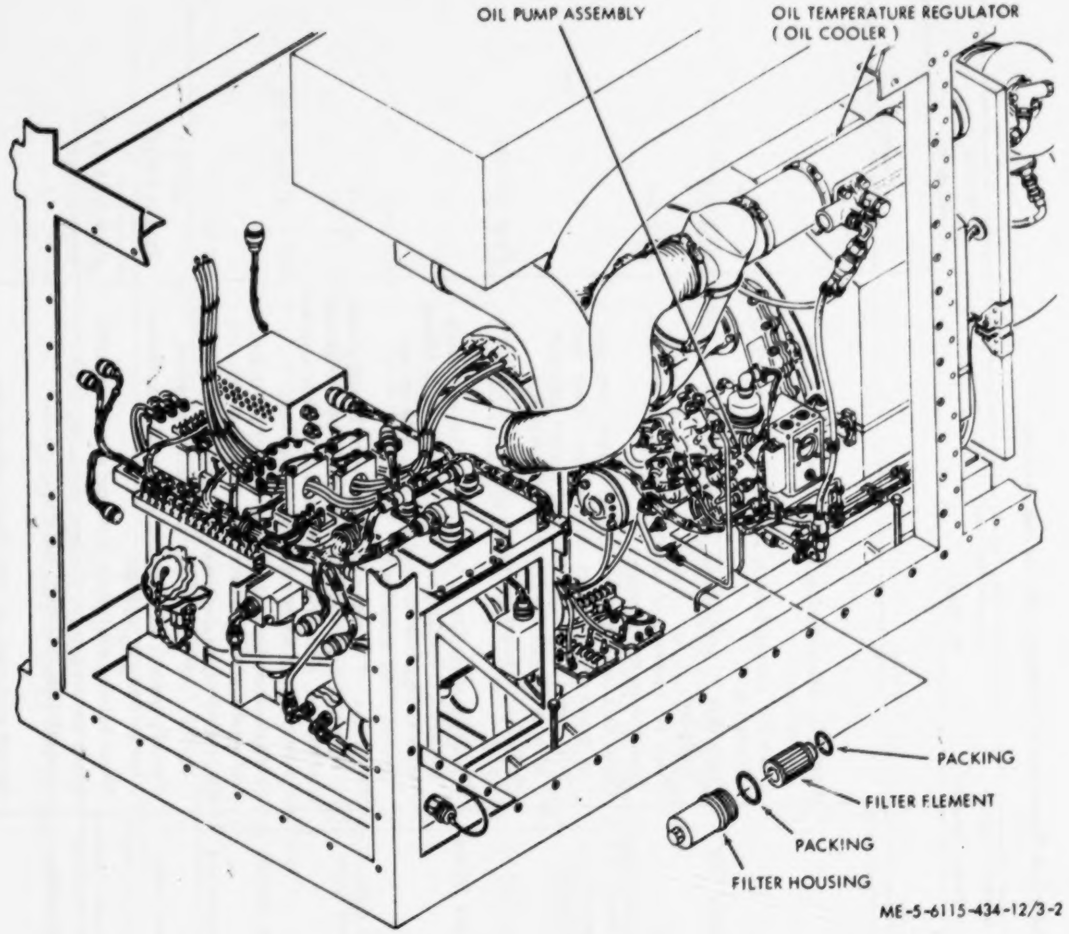

OIL PUMP ASSEMBLY
OIL TEMPERATURE REGULATOR (OIL COOLER)
PACKING
FILTER ELEMENT
PACKING
FILTER HOUSING
ME-5-6115-434-12/3-2

Figure 3-2. Oil filter element removal.

3-6. Preventive Maintenance Checks and Services

Preventive maintenance checks and services are listed and described in table 3-2.

Section IV. TROUBLESHOOTING

3-7. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the power unit and its components. Malfunctions which may occur are listed in table 3-3. Each malfunction stated is followed by a list of probable causes of the trouble. The corrective action recommended is described opposite the probable cause. A gas turbine engine analyzer is used in conjunction with table 3-3 for checking engine operation and isolating malfunctioning components during troubleshooting of the engine and for check and adjustment of engine components after repair. The connection and operation of the engine analyzer is described in paragraph 3-8. A temperature conversion chart is provided in table 3-4.

Table 3-2. Preventive Maintenance Checks and Services

B—Before operation D—During operation A—After operation W—Weekly M—Monthly Q—Quarterly

Item number	Interval						Item to be inspected	Procedure	Reference
	Operator				Org.				
	Daily				M	Q			
	B	D	A	W					
1	x				x	x	Lubricate in accordance with lubrication order		
2	x	x					Fuel supply	Check for adequate fuel for anticipated length of operation.	
3	x	x					Water supply	Check for adequate water for anticipated length of operation.	
4	x						Connections to power unit	Check that all connections are properly and securely installed.	Para 2-3
5	x				x	x	Fire extinguisher	Check for presence of safety seals and observe procedures on extinguisher.	Para 2-1
6	x	x					Drain lines and drain openings in floor of power unit enclosure	Check that compartment moisture drain lines and openings are free from obstructions. Check that fuel drain openings below fuel control unit and turbine plenum are free from obstructions.	
7	x						Exhaust openings in top of enclosure	Check that exhaust openings are free from obstruction.	Para 2-1*a*(6)
8		x					Return air inlet air filters	Visually inspect filters for accumulation of foreign material, corrosion, or other damage. Clean filters with an approved solvent and coat with an approved filter adhesive.	
9		x					Refrigerant level sight glass	Check level of refrigerant in receivers. If refrigerant is present glass will appear dark. If no refrigerant is present, glass will appear shiny. If glass appears shiny, notify direct support maintenance.	Fig. 1-9
10		x					Battery charging current	Check dc ammeter on instrument panel for indication of + charging current.	
11		x					Exhaust gas temperature	Check that exhaust gas temperature does not exceed 1225°F (663°C) during steady state operation.	
12			x	x	x		Plumbing lines and components	Visually inspect all plumbing lines and components for evidence of leakage.	Para 2-1(*a*)(5)
13				x	x	x	Batteries	Check battery electrolyte level and specific gravity.	Para 2-1*b*(1)(*c*)
14				x	x	x	Fans, condensers, evaporators, compressors, and air filters	Check for evidence of damage, corrosion, or accumulation of foreign material.	Para 2-1*a*(3)
15					x	x	Collector box	Inspect and clean air inlet filter collector box.	

Table 3-2. Preventive Maintenance Checks and Services—Continued

B—Before operation A—After operation M—Monthly
D—During operation W—Weekly Q—Quarterly

Item number	Interval						Item to be inspected	Procedure	Reference
	Operator				Org.				
	Daily				M	Q			
	B	D	A	W					
16					x	x	Electrical wiring	Visually inspect for evidence of burned, frayed, or otherwise damaged insulation. Check terminals and connectors for secure connection.	Para 2-1a(5)
17					x	x	Fuel filter elements	Replace fuel filter elements each 250 hours of operation.	Para 3-17, 3-18, 3-19
18						x	Air pressure regulator filter element	Inspect and clean filter element each 2500 hours of operation.	Para 3-72
19					x	x	Fuel atomizer	Inspect and clean fuel atomizer each 250 hours of operation.	Para 3-25
20					x	x	Igniter plug	Inspect and clean igniter plug each 250 hours of operation.	Para 3-48
21					x	x	Combustion chamber liner assembly	Inspect and clean liner assembly each 250 hours of operation.	Para 3-25
22					x	x	Doors, panels, frame, structural parts, and insulation material	Visually inspect for damage, corrosion, or other evidence of deterioration.	
23					x	x	Hinges, fasteners, receptacles, connectors, and fittings	Inspect for damage and corrosion.	
24						x		Check for cleanliness, leakage, secure installation, corrosion, and other damage.	

Table 3–3. Troubleshooting

	Malfunction	Probable cause	Corrective action
1	Fuel boost pump and motor assembly fail to run.	*a.* Improper starting procedure	*a.* Review preparation for starting procedure (para 2–14*a*).
			b. Check specific gravity of electrolyte (para 2–1*b* (1) (*c*)). Recharge or replace batteries as indicated or utilize external power source (para 2–3*b*(4)).
		c. Battery cables corroded or disconnected.	*c.* Connect battery cables (para 2–1*b*(*f*)). Clean battery cables (para 2–1*b*(1), (*e*)). Install new batteries as indicated (para 2–1*b*(2)).
		d. Low or depleted fuel supply	*d.* Replenish fuel supply.
		e. Circuit breaker (CB1) tripped or failed.	*e.* Reset (press) circuit breaker. Replace failed circuit breaker (para 3–55*j*).
		f. Improper electrical connections to fuel boost pump motor assembly.	*f.* Tighten or replace connections to fuel boost pump motor assembly.
		g. Master switch (S1) failed	*g.* Check for continuity between switch poles with power supply off and switch on. If no continuity replace failed master switch (S1) (para 3–55*d*).
		h. Fuel boost pump switch (S8) failed.	*h.* Replace failed fuel boost pump switch (S8) (para 3–55*d*).
		i. Air intake door switch (S4) failed.	*i.* Check for sticking actuator. Replace failed air intake door switch (S4).
		j. Shunt (R1) failed.	*j.* Replace failed shunt (R1) (para 3–61*l*).
		k. Diode (CR7) failed	*k.* Replace failed diode (CR7).
		l. Fuel boost pump motor assembly (B2) failed.	*l.* Replace failed fuel boost pump and motor assembly (B2) (para 3–21).
		m. Other causes	*m.* Refer other causes to direct and general support maintenance personnel.
2	No response when master switch (S1) placed in START position.	*a.* Improper starting procedure	*a.* Review preparation for starting procedure (para 2–14*a*).
		b. Low charged batteries	*b.* Check specific gravity of electrolyte (para 2–1*b*(1), (*c*)). Recharge or replace batteries as indicated or utilize external power source (para 2–3*b*(4)).
		c. Battery cables corroded or disconnected.	*c.* Connect battery cables (para 2–1*b*(*f*)). Clean battery cables (para 2–1*b*(1) (*e*)). Install new batteries as indicated (para 2–1*b*(2)).

Table 3-3. Troubleshooting—Continued

	Malfunction	Probable cause	Corrective action
2	No response when master switch (S1) placed in START position.—Continued	*d.* Circuit breaker (CB1) tripped or failed.	*d.* Reset (press) circuit breaker. Replace failed circuit breaker (para 3-55*j*).
		e. Master switch (S1) failed	*e.* Replace failed master switch (S1) (para 3-55*d*).
		f. Air intake door switch (S4) failed.	*f.* Check for sticking actuator. Replace failed air intake door switch (S4).
		g. Improper electrical connections to start motor.	*g.* Tighten or replace electrical connections as indicated.
		h. Starter cables failed	*h.* Replace failed starter cables.
		i. Start relay (K1) failed	*i.* Replace failed start relay (K1) (para 3-62*a*).
		j. 400 Hz main contactor switch (S2) not in open position or failed.	*j.* Place switch in open position. Replace failed 400 Hz main contactor switch (S2) (para 3-55*d*).
		k. 60 Hz output contactor switch not in open position or failed.	*k.* Place switch in open position. Replace failed 60 Hz output contactor switch (S3) (para 3-55*d*).
		l. Centrifugal multispeed switch assembly overspeed (110 percent) switch or 35 percent switch open.	*l.* Replace failed centrifugal multi-speed switch assembly (para 3-45).
		m. Start motor failed	*m.* Replace failed start motor (para 3-44).
		n. Time delay relay (K4) failed	*n.* Replace failed relay assembly (para 3-61*c*).
		o. Other causes	*o.* Refer other causes to direct and general support maintenance personnel.
3	Start motor runs but does not rotate engine.	*a.* Start motor assembly failed	*a.* Replace failed start motor assembly (para 3-44).
		b. Other causes	*b.* Refer other causes to direct and general support maintenance personnel.
4	Engine stops motoring when master switch is released from start position.	*a.* Master switch (S1) failed	*a.* Replace failed master switch (S1) (para 3-55*d*).
		b. Start relay (K1) failed	*b.* Replace failed start relay (K1) (para 3-62*a*).
		c. Turbine holding relay (K3) failed.	*c.* Replace failed relay assembly (para 3-61*c*).
		d. Time delay relay (K4) failed	*d.* Replace failed time delay relay (K4) (para 3-61*c*).
		e. Other causes	*e.* Refer other causes to direct and general support personnel.
5	Start motor fails to shut off when engine reaches 35 percent governed speed.	*a.* Start relay (K1) failed	*a.* Replace failed start relay (K1) (para 3-62*a*).
		b. Centrifugal multispeed switch assembly 35 percent switch closed.	*b.* Replace failed centrifugal multi-speed switch assembly (para 3-45).
		c. Other causes	*c.* Refer other causes to direct and general support maintenance personnel.

Table 3-3. Troubleshooting—Continued

	Malfunction	Probable cause	Corrective action
6	Engine motors but combustion does not occur.	*a.* Low charged batteries	*a.* Check specific gravity of electrolyte (para 2-1*b*(1)(*c*)). Recharge or replace batteries as indicated or utilize external power source (para 2-3*b*(4)).
		b. Low or depleted fuel supply	*b.* Replenish fuel supply.
		c. Fuel filters clogged	*c.* Check and replace fuel filters as indicated (para 3-17, 3-18, or 3-19).
		d. Fuel control assembly failed	*d.* Replace failed fuel control assembly (para 3-24).
		e. Fuel boost pump and motor assembly failed.	*e.* Replace failed fuel boost pump and motor assembly (para 3-21).
		f. Fuel atomizer screen clogged	*f.* Clean screen (para 3-25*b*) or replace fuel atomizer assembly (para 3-25).
		g. Fuel solenoid valve failed	*g.* Check for actuation of solenoid valve (para 3-23*c*). Replace failed fuel solenoid valve (para 3-23).
		h. Oil supply low	*h.* Check and replenish oil supply.
		i. Oil pump pressure relief valve stuck open.	*i.* Replace failed oil pump pressure relief valve (para 3-31).
		j. Oil pressure sequencing switch improperly adjusted or failed.	*j.* Refer to para 3-46*d* for adjustment procedure. Replace failed oil pressure sequencing switch (para 3-46).
		k. Turbine exhaust obstructed	*k.* Remove obstruction.
		l. Ignition unit failed	*l.* See para 3-47 for ignition unit test. Replace failed ignition unit (para 3-47).
		m. Igniter plug or ignition lead assembly failed.	*m.* See para 3-48*c* for igniter plug test or para 3-49*c* for ignition lead assembly test. Replace failed igniter plug (para 3-48) or ignition lead assembly (para 3-49).
		n. Other causes	*n.* Refer other causes to direct and general support maintenance personnel.
7	Engine starts, accelerates to governed speed or less and shuts down.	*a.* High fuel pump governor setting.	*a.* Adjust governor setting (para 3-8*e*(4) or replace fuel control assembly (para 3-24).
		b. Centrifugal multispeed switch assembly overspeed (110 percent) switch setting low or failed.	*b.* Refer to para 3-8*e*(6) for adjustment procedure. Replace failed centrifugal multi-speed switch assembly (para 3-45).

Table 3–3. Troubleshooting—Continued

	Malfunction	Probable cause	Corrective action
7	**Engine starts, accelerates to governed speed or less and shuts down. —Continued.**	*c.* Generator shorted, creating drag on engine and causing shutdown at approximately 35 percent governed speed.	*c.* Replace failed generator (400 Hz or 60 Hz) (para 3–64 or 3–65).
8	**Combustion occurs but engine will not accelerate or accelerates too slowly.**	*a.* Low charged batteries	*a.* Check specific gravity of electrolyte (para 2–1*b*). Recharge or replace batteries as indicated or utilize external power source (para 2–3*b*(4)).
		b. Low or depleted fuel supply	*b.* Replenish fuel supply.
		c. Control air lines leaking	*c.* Check control air lines and fittings. If air lines and fittings are secure, replace fuel control assembly (para 3–24).
		d. Acceleration limiter valve improperly adjusted or failed.	*d.* Refer to para 3–8*e*(3) for adjustment procedure. If proper adjustment cannot be obtained replace fuel control assembly (para 3–24).
		e. Fuel control assembly failed	*e.* Replace failed fuel control assembly (para 3–24).
		f. Acceleration and overtemperature control thermostat improperly adjusted or failed.	*f.* Refer to para 3–8*e*(1) for adjustment procedure. Replace failed thermostat (para 3–26).
		g. Fuel atomizer valve capsule stuck closed or carbon on nozzle.	*g.* Replace fuel atomizer assembly (para 3–25).
		h. Fuel atomizer assembly failed.	*h.* Replace failed fuel atomizer assembly (para 3–25).
		i. Air being bled from engine prematurely.	*i.* Check load control valve for closed position. Replace load control valve (para 3–70) if full closed. Check for leakage from ducts and turbine plenum.
		j. Other causes	*j.* Refer other causes to direct and general support maintenance personnel.
9	**Excessive exhaust gas temperature on start.**	*a.* Acceleration and overtemperature control thermostat improperly adjusted or failed.	*a.* Refer to para 3–8*e*(1) for adjustment procedure. Replace failed thermostat (para 3–26).
		b. Acceleration limiter valve improperly adjusted or failed.	*b.* Refer to para 3–8*e*(3) for adjustment procedure. If proper adjustment cannot be obtained, replace fuel control assembly (para 3–24).
		c. Fuel atomizer flow divider valve stuck open.	*c.* Replace fuel atomizer assembly (para 3–25).
		d. Other causes	*d.* Refer other causes to direct and general support maintenance personnel.

Table 3-3. Troubleshooting—Continued

Malfunction		Probable cause	Corrective action
10	Erratic engine acceleration, operation, or inability to carry load.	*a.* Contamination in fuel spray	*a.* Replace fuel filters (para 3-17, 3-18, or 3-19).
		b. Fuel atomizer assembly partially closed.	*b.* Clean fuel atomizer screen (para 3-25*b*) or replace fuel atomizer assembly (para 3-25).
		c. Fuel filter partially clogged	*c.* Check and replace fuel filters (para 3-17, 3-18, or 3-19).
		d. Control air lines leaking	*d.* Check control air lines and fittings. If air lines and fittings are secure, replace fuel control assembly (para 3-24).
		e. Acceleration and overtemperature control thermostat improperly adjusted or failed.	*e.* Refer to para 3-8*e*(1) for adjustment procedure. Replace failed thermostat (para 3-26).
		f. Fuel control assembly failed	*f.* Replace failed fuel control assembly (para 3-24).
		g. Flame tube and combustion cap assembly excessively carboned, deformed or damaged.	*g.* Clean flame tube and combustion cap assembly (para 3-25*b*) or replace as required (para 3-25).
		h. Load control valve not fully closed.	*h.* Check load control valve for full closed position. If full closed position cannot be obtained, replace load control valve (para 3-70).
		i. Fuel solenoid valve failed	*i.* Check for actuation of solenoid valve (para 3-23*c*). Replace failed fuel solenoid valve (para 3-23).
		j. Fuel boost pump and motor assembly failed.	*j.* Replace failed fuel boost pump and motor assembly (para 3-21).
		k. Restricted fuel supply	*k.* Remove fuel supply restriction.
		l. Other causes	*l.* Refer other causes to direct and general support maintenance personnel.
11	Smoke emitted for short time after start.	*a.* Excessive oil in system or oil tank.	*a.* Drain oil to proper level.
		b. Scavange oil pump failed	*b.* Replace failed scavenge oil pump (para 3-37).
		c. Fuel plenum drain check valve sticking closed.	*c.* Clean or replace fuel plenum drain check valve (para 3-27).
		d. Internal seal failure	*d.* Refer the trouble to direct and general support maintenance personnel.
		e. Other causes	*e.* Refer other causes to direct and general support maintenance personnel.

Table 3-3. Troubleshooting—Continued

Malfunction		Probable cause	Corrective action
12	Excessive oil temperature.	*a.* Low oil supply	*a.* Check oil tank dipstick for proper oil level.
		b. Oil cooler cooling air tubes restricted.	*b.* Remove restriction.
		c. Cooling fan failed	*c.* Replace failed cooling fan (para 3-39).
		d. Oil temperature regulator valve failed.	*d.* Replace failed oil temperature regulator valve (para 3-41).
		e. Other causes	*e.* Refer other causes to direct and general support maintenance personnel.
13	Loss of oil pressure.	*a.* Low oil supply	*a.* Check oil tank dipstick for proper oil level.
		b. Oil pump pressure relief valve stuck open.	*b.* Replace failed oil pump pressure relief valve (para 3-31).
		c. Oil line kinked or damaged	*c.* Replace damaged oil line (para 3-29).
		d. Oil filter element dirty or clogged.	*d.* Replace oil filter element (para 3-30).
		e. Other causes	*e.* Refer other causes to direct and general support maintenance personnel.
14	Load control valve fails to open.	*a.* No 400 Hz power	*a.* Refer to para 2-16*b* for operation to deliver 400 Hz electrical power. Replace failed components as required.
		b. Valve solenoid assembly failed.	*b.* Replace failed solenoid valve assembly.
		c. Air pressure regulator improperly adjusted, filter contaminated, or failed.	*c.* Refer to para 3-8*e*(5) for adjustment procedure. Refer to para 3-72 for filter element replacement procedure. Replace failed air pressure regulator (para 3-71).
		d. Load control thermostat improperly adjusted or failed.	*d.* Refer to para 3-8*e*(2) for adjustment procedure. Replace failed load control thermostat (para 3-73).
		e. Control air line leaking or damaged.	*e.* Check control air line and fittings for air leaks. Tighten as required, or replace damaged line.
		f. Load control valve failed.	*f.* Replace failed load control valve (para 3-70).
		g. Other causes	*g.* Refer other causes to direct and general support maintenance personnel.
15	No 60 Hz ac generator output (60 Hz trip indicator lamp (DS5) illuminated.	*a.* Overload on output	*a.* Adjust load, reset load contactor switch (S3) and check each phase with 60 Hz volt-amp switch (S25).
		b. 60 Hz load contactor switch (S3) failed.	*b.* Replace failed 60 Hz lead contactor switch (para 3-55*d*).

Table 3–3. Troubleshooting—Continued

	Malfunction	Probable cause	Corrective action
15	No 60 Hz ac generator output (60 Hz trip indicator lamp (DS5) illuminated. —Continued.	*c.* Underfrequency arming relay (K6) failed.	*c.* Refer to para 3–61*c*(3) to check for K6 relay failure. Replace failed relay assembly (para 3–61*c*).
		d. 60 Hz generator control relay (K8) failed.	*d.* Replace failed relay assembly (para 3–61*c*).
		e. 60 Hz output contactor relay (K11) failed.	*e.* Replace failed relay (K11) (para 3–62*b*).
		f. Voltage regulator (VR2) failed.	*f.* Refer to para 3–61, to check for failed voltage regulator. Replace failed regulator (para 3–61*a*).
		g. 60 Hz protective panel failed	*g.* Refer to para 3–61*d*(3) to check for protective panel failure. Replace failed protective panel (para 3–61*d*).
		h. 60 Hz ac generator failed	*h.* Refer to para 3–65, a to check for generator failure. Replace failed 60 Hz ac generator (para 3–65).
		i. Other causes	*i.* Refer other causes to direct and general support maintenance personnel.
16	No 400 Hz ac generator output.	*a.* Overload on output	*a.* Adjust load. Reset contactor switch (switch is thermal, wait 10 minutes to reset). Check each phase with volt-amp switch.
		b. 400 Hz output contactor (K12) failed.	*b.* Replace failed contactor (K12) (para 3–61*f*).
		c. 400 Hz output contactor switch (S9) failed.	*c.* Replace failed contactor switch (S9) (para 3–55*d*).
		d. 400 Hz main contactor (K10) failed.	*d.* Replace failed contactor (K10) (para 3–61*e*).
		e. 400 Hz main contactor switch (S2) failed.	*e.* Replace failed 400 Hz main contactor switch (S2) (para 3–55*d*).
		f. Underfrequency arming relay (K6).	*f.* Replace failed relay assembly (para 3–61*c*).
		g. 400 Hz generator control relay.	*g.* Replace failed relay assembly (para 3–61*c*).
		h. 400 Hz auxiliary main contactor relay (K9) failed.	*h.* Replace failed relay assembly (para 3–61*c*).
		i. Voltage regulator (VR1) failed.	*i.* Refer to para 3–61*b*(3) to check for voltage regulator failure. Replace failed voltage regulator (VR1) (para 3–61*b*).
		j. 400 Hz protective panel switch.	*j.* Refer to para 3–61*d*(3) to check for protective panel failure. Replace failed protective panel (para 3–61*d*).
		k. Other causes	*k.* Refer other causes to direct and general support maintenance personnel.

Table 3–3. Troubleshooting—Continued

	Malfunction	Probable cause	Corrective action
17	No water at water system outlets.	*a.* Low or no water supply	*a.* Check and replenish water supply.
		b. Water system not properly primed.	*b.* Refer to para 2–3*b*(5) for proper priming instructions.
		c. No 400 Hz power	*c.* Refer to para 2–16*b* for operation to deliver 400 Hz electrical power. Replace failed components as required.
		d. 400 Hz auxiliary main contactor (K9) failed.	*d.* Replace failed relay assembly (para 3–61*c*).
		e. Cold water pump contactor (K13) failed.	*e.* Replace failed cold water pump contactor (K13) (para 3–61*g*).
		f. Hot water pump contactor (K15) failed.	*f.* Replace failed hot water pump contactor (K15) (para 3–61*h*).
		g. Circuit breakers (CB6), (CB19) or (CB11) open or failed	*g* Reset (press) circuit breakers. Replace failed circuit breakers (CB6), (CB10), or (CB11), as required (para 3–55).
		h. Cold water pressure switch (S13) failed.	*h.* Replace failed cold water (para 3–77).
		i. Other causes	*i.* Refer other causes to direct pressure switch (S13) and general support maintenance personnel.
18	No hot water.	*a.* Exhaust gas flow control valve (K14).	*a.* Replace failed flow control valve (K14).
		b. Hot water temperature switch (S12) failed.	*b.* Replace failed hot water temperature switch (S12) (para 3–77).
		c. Pressure switch (S11) failed	*c.* Replace failed pressure switch (S11) (para 3–77).
		d. 400 Hz auxiliary main contactor relay (K9) failed.	*d.* Replace failed relay assembly (para 3–61*c*).
		e. Pressure regulator failed	*e.* Replace failed pressure regulator (para 3–77).
		f. Hot water pump (B15) failed.	*f.* Replace failed hot water pump (B15) (para 3–77).
		g. Other causes	*g.* Refer other causes to direct and general support maintenance personnel.
19	Hot water excessively hot or turned to steam.	*a.* Exhaust gas flow control valve failed.	*a.* Replace failed flow control valve (para 3–77).
		b. Hot water temperature switch (S12) failed.	*b.* Replace failed hot water temperature switch (S12) (para 3–77).
		c. Other causes	*c.* Refer other causes to direct and general support maintenance personnel.
20	Ventilating air system will not start.	*a.* No 400 Hz power	*a.* Refer to para –216*b* for operation to deliver 400 Hz electrical power. Replace failed components as required.

Table 3–3. Troubleshooting—Continued

Malfunction		Probable cause	Corrective action
20	Ventilating air system will not start. —Continued.	*b.* Recirculating fan circuit breakers (CB15 and CB16) open or failed.	*b.* Reset (press) recirculating fans circuit breakers. Replace failed circuit breakers (CB15 and CB16) as required (para 3–56*d*).
		c. Vent system select switch (S14) failed.	*c.* Replace failed vent system select switch (S14) (para 3–55*h*).
		d. Mode select switch (S16) failed.	*d.* Replace failed mode select switch (S16) (para 3–55*h*).
		e. Recirculating fan contractors (K25) or (K26) failed.	*e.* Replace failed recirculating fan contactors (K25 or K26) as required (para 3–57*b*).
		f. Diode (CR12) failed	*f.* Replace failed diode (CR12).
		g. Other causes	*g.* Refer other causes to direct and general support maintenance personnel.
21	Heated air system will not deliver heated air.	*a.* No 400 Hz power	*a.* Refer to para 2–16*b* for operation to deliver 400 Hz electrical power. Replace failed components, as required.
		b. Recirculating fans circuit breakers (CB15) or (CB16) open or failed.	*b.* Reset (press) circuit breakers. Replace failed recirculating fan circuit breakers (CB15) or (CB16), as required (para 3–56*d*).
		c. Heat system select switch (S31) failed.	*c.* Replace failed heat system select switch (S31) (para 3–55*h*).
		d. Mode selector switch (S16) failed.	*d.* Replace failed mode selector switch (S16) (para 3–55*h*).
		e. Load control valve failed	*e.* Replace failed load control valve (para 3–70).
		f. Air pressure regulator failed	*f.* Replace failed air pressure regulator (para 3–17).
		g. Load control thermostat improperly adjusted or failed.	*g.* Refer to para 3–8*e*(2) for adjustment procedure. If thermostat cannot be adjusted, replace load control thermostat (para 3–73).
		h. Heat temperature senses (R1, R2, R5, R6) failed.	*h.* Replace failed heat temperature sensors (R1, R2, R5, R6) as required.
		i. Heat system flow control valve failed.	*i.* Replace failed heat system flow control valve (para 3–74).
		j. Overtemperature thermoswitch (TS5) or (TS9) failed.	*j.* Replace failed overtemperature thermoswitch (TS5) or (TS9), as required.
		k. Diode (CR15) or (CR16) failed.	*k.* Replace failed diode (CR15) or (CR16), as required.
		l. Jumper plug (J93) not installed or missing.	*l.* Install or replace jumper plug (J93), as required.
		m. Other causes	*m.* Refer other causes to direct and general support maintenance personnel.

Table 3-3. Troubleshooting—Continued

	Malfunction	Probable cause	Corrective action
22	Cooled air system will not deliver cooled air (refer also to malfunctions listed under item 20).	*a.* System low on refrigerant	*a.* Check sight glass. If refrigerant is low, refer the trouble to direct and general support maintenance personnel.
		b. Solenoid valves, pressure controls, metering devices and lines leaking or failed.	*b.* Refer failure to direct and general support maintenance personnel.
		c. Compressor time delay and reset relay (K17) or (K18) failed.	*c.* Replace failed relay (K17) or (K18) as required (para. 3-57*c*).
		d. Other causes.	*d.* Refer other causes to direct and general support maintenance personnel.

Table 3-4. Temperature Conversion Chart

To convert a temperature from °C. to °F.—locate Centigrade temperature in the center column and read the corresponding Fahrenheit value in the column to the left.

To convert a temperature from °F. to °C.—locate Fahrenheit temperature in the center column and read the corresponding Centigrade value in the column to the right.

°F	°C °F	°C	°F	°C °F	°C	°F	°C °F	°C	°F	°C °F	°C
	-459.7	-273.2		-320	-195.6	-310	-190	-123.3	- 58.0	- 50	- 45.6
	-450	-267.8		-310	-190.0	-292.0	-180	-117.8	- 40.0	- 40	- 40.0
	-440	-262.2		-300	-184.3	-274.0	-170	-112.2	- 36.4	- 38	- 38.9
	-430	-256.7		-290	-178.9	-256.0	-160	-106.7	- 32.8	- 36	- 37.8
	-420	-251.1		-280	-173.3	-238.0	-150	-101.1	- 29.2	- 34	- 36.7
	-410	-245.6	-459.7	-273.2	-169.6	-220	-140	- 95.6	- 25.6	- 32	- 35.6
	-400	-240.0	-454.0	-270	-167.8	-202.0	-130	- 90.0	- 22.0	- 30	- 34.4
	-390	-234.4	-436.0	-260	-162.2	-184.0	-120	- 84.4	- 18.4	- 28	- 33.3
	-380	-228.9	-418.0	-250	-156.7	-166.0	-110	- 78.9	- 14.8	- 26	- 32.2
	-370	-223.3	-400.0	-240	-151.1	-148.0	-100	- 73.3	- 11.2	- 24	- 31.1
	-360	-217.8	-382.0	-230	-145.6	-130.0	- 90	- 67.8	- 7.6	- 22	- 30.0
	-350	-212.2	-364.0	-220	-140.0	-112.0	- 80	- 62.2	- 4.0	- 20	- 28.9
	-340	-206.7	-346.0	-210	-134.4	- 94.0	- 70	- 56.7	- 0.4	- 18	- 27.8
	-330	-201.1	-328.0	-200	-128.9	- 76.0	- 60	- 51.1	+ 3.2	- 16	- 26.7
6.8	-14	-25.6	71.6	22	- 5.6	136.4	58	14.4	201.2	94	34.4
10.4	-12	-24.4	75.2	24	- 4.4	140.0	60	15.6	204.8	96	35.6
14.0	-10	-23.3	78.8	26	- 3.3	143.6	62	16.7	208.4	98	36.7
17.57	- 8	-22.2	82.4	28	- 2.2	147.2	64	17.8	212.0	100	37.8
21.2	- 6	-21.1	86.0	30	- 1.1	150.8	66	18.9	215.6	102	38.9
24.8	- -	-20.0	89.6	32	0	154.4	68	20.0	219.6	104	40.0
28.4	- 2	-18.9	93.2	34	+ 1.1	158.0	70	21.1	222.8	106	41.1
32.0	0	-17.8	96.8	36	2.2	161.6	72	22.2	226.4	108	42.2
35.6	+ 2	-16.7	100.4	38	3.3	165.2	74	23.3	230.0	110	43.3
39.2	4	-15.6	104.0	40	4.4	168.8	76	24.4	233.6	112	44.4
42.8	6	-14.4	107.6	42	5.6	172.4	78	25.6	237.2	114	45.6
46.4	8	-13.3	111.2	44	6.7	176.0	80	26.7	240.8	116	46.7
50.0	10	-12.2	114.8	46	7.8	179.6	82	27.8	244.4	118	47.8
53.6	12	-11.1	118.4	48	8.9	183.2	84	28.9	248.0	120	48.9
57.2	14	-10.0	122.0	50	10.0	186.8	86	30.0	251.6	122	50.0
60.8	16	- 8.9	125.6	52	11.1	190.4	88	31.1	255.2	124	51.1
64.4	18	- 7.8	129.2	54	12.2	194.0	90	32.2	258.8	126	52.2
68.0	20	- 6.7	132.8	56	13.3	197.6	92	33.3	262.4	128	53.3
266.0	130	54.4	327.2	164	73.3	392.0	200	93.3	453.2	234	112.2
269.6	132	55.6	330.8	166	74.4	395.6	202	94.4	465.8	236	113.3
273.2	134	56.7	334.4	168	75.6	399.2	204	95.6	460.4	238	114.4
276.8	136	57.8	338.0	170	76.7	402.8	206	96.7	464.0	240	115.6

Table 3–4. *Temperature Conversion Chart—Continued*

°F	°C °F	°C	°F	°C °F	°C	°F	°C °F	°C	°F	°C °F	°C
280.4	138	58.9	345.2	174	78.9	406.4	208	97.8	467.6	242	116.7
284.0	140	60.0	348.8	176	80.0	410.0	210	98.9	471.2	244	117.8
287.6	142	61.1	352.4	178	81.1	413.6	212	100.0	474.8	246	118.9
291.2	144	62.2	356.0	180	82.2	417.2	214	101.1	478.4	248	120.0
294.8	146	63.3	359.6	182	83.3	420.8	216	102.2	482.0	250	121.1
298.4	148	64.4	363.2	184	84.4	424.4	218	103.3	500.0	260	126.7
302.0	150	65.6	366.8	186	85.6	428.0	220	104.4	518.0	270	132.2
305.6	152	66.7	370.4	188	86.7	431.6	222	105.6	536.0	280	137.8
309.2	154	67.8	374.0	190	87.8	435.2	224	106.7	554.0	290	143.3
312.8	156	68.9	377.6	192	88.9	438.8	226	107.8	572.0	300	148.9
316.4	158	70.0	381.2	194	90.0	442.4	228	108.9	590.0	310	154.4
320.0	160	71.1	384.8	196	91.1	446.0	230	110.0	608.0	320	160.0
323.6	162	72.2	388.4	198	92.2	449.6	232	111.1	626.0	330	165.6
644.0	340	171.1	968.0	520	271.1	1292.0	700	371.2	1616	880	471.1
662.0	350	176.7	986.0	530	276.7	1310.0	710	376.7	1634.0	890	476.7
680.0	360	182.2	1004.0	540	282.2	1328.0	720	382.2	1652.0	900	482.2
698.0	370	187.8	1022.0	550	287.8	1346.0	730	387.8	1670.0	910	487.8
716.0	380	193.3	1040.0	560	293.3	1364.0	740	393.3	1688.0	920	493.3
734.0	390	198.9	1058.0	570	298.9	1382.0	750	398.9	1706.0	930	498.9
752.0	400	204.4	1076.0	580	304.4	1400.0	760	404.4	1724.0	940	504.4
770.0	410	210.0	1094.0	590	310.0	1418.0	770	410.0	1742.0	950	510.0
788.0	420	215.6	1112.0	600	315.6	1436.0	780	415.6	1760.0	960	521.1
806.0	430	221.1	1130.0	610	321.1	1454.0	790	421.1	1778.0	970	521.1
824.0	440	226.7	1148.0	620	326.7	1472.0	800	426.8	1796.0	980	526.7
842.0	450	232.2	1166.0	630	332.2	1490.0	810	432.2	1814.0	990	532.2
860.0	460	237.8	1184.0	640	337.8	1508.0	820	437.8	1832.0	1000	537.8
878.0	470	243.3	1202.0	650	343.3	1526.0	830	443.3	1922.0	1050	565.5
896.0	480	248.9	1220.0	660	348.9	1544.0	840	448.9	2012.0	1100	593.2
914.0	490	254.4	1238.0	670	354.4	1562.0	850	454.4	2102.0	1150	621.1
932.0	500	260.0	1256.0	680	360.0	1580.0	860	460.0	2192.0	1200	648.9
950.0	510	265.6	1274.0	690	365.5	1598.0	870	465.6	2282.0	1250	676.7
									2372.0	1300	704.4

3-8. Using Gas Turbine Engine Analyzer During Troubleshooting

a. Gas Turbine Engine Analyzer. The gas turbine engine analyzer provides instrumentation for checking the engine electrical, hydraulic, and control air systems and for controlling and monitoring engine operation during troubleshooting or checking procedures after repair. The analyzer includes a separate portable fuel pressure gage and gage saver, a multimeter, and special cable assemblies, all of which are stored in the analyzer case. The analyzer control panel is shown in figure 3-3. The analyzer cables, and a special purpose cable assembly required to connect the analyzer to the power unit are shown in figure 3-4. An overlay plate, part of the special purpose cable assembly, which must be installed on the analyzer panel to provide connection nomenclature, is shown in figure 3-4.

b. Connection of Gas Turbine Engine Analyzer to Power Unit. Connect the analyzer to the power unit as shown in figure 3-5 while observing the following.

(1) Place analyzer (fig. 3-5) in a convenient position near the left side of the power unit to facilitate connections. Insure that all analyzer switches are in OFF or spring-loaded position.

(2) Install main receptacle of special purpose cable assembly on MAIN plug of analyzer panel (fig. 3-5). Install overlay plate (fig. 3-4), attached to special purpose cable assembly, over analyzer indicator lights and switches locating cutout in plate over READY TO LOAD LIGHT on analyzer panel (fig. 3-3) to provide correct identification of analyzer lights, switches, and static test jacks.

(3) Disconnect engine harness receptacle J36 from power plant plug P36 (fig. 3-5). Connect engine plug on special purpose cable assembly to engine harness receptacle J36 (fig. 3-5); connect power plant P36 receptacle on special purpose cable assembly to power plant plug P36 (fig. 3-5).

(4) Disconnect instrument panel harness receptacle J14 from power plant plug P14 (fig. 3-5). Connect instrument panel plug on special purpose cable assembly to instrument panel harness receptacle J14 (fig. 3-5); connect power plant P14 plug receptacle on special purpose cable assembly to power plant plug P14 (fig. 3-5).

(5) Connect thermocouple receptacle on special purpose cable assembly to thermocouple plug on analyzer panel (fig. 3-5).

(6) Remove cap from acceleration limiter valve tee. Connect a control air plumbing line from open leg of tee to AIR IN fitting on analyzer panel (fig. 3-5). Remove cap from AIR OUT fitting on analyzer panel (fig. 3-3).

(7) Remove cap from fuel control governor cover port. Connect a fuel pressure plumbing line from the governor cover port to FUEL fitting on analyzer panel (fig. 3-5).

Note. The tee at the fuel solenoid valve outlet may also be used to read fuel pressure to the atomizer but is not the preferred check point.

c. Static Check of Components. Perform static check of engine components as follows.

(1) Place all analyzer switches in the OFF or spring-loaded position.

(2) Place MASTER switch on power unit instrument panel (fig. 2-14) in RUN position to provide DC power to engine circuits.

(3) Insert static test plug on special purpose cable assembly (fig. 3-5) in the appropriate test jack for the component to be checked (as identified by the overlay plate fig. 3-4), actuate static check switch on special purpose cable assembly (fig. 3-5). The component being checked may be heard or felt to actuate.

Note. The multimeter provided with the analyzer may be connected in series with the static test lead and actuation of the component being checked will be indicated on the multimeter ampere scale by current draw.

d. Functional Check Procedure. Perform functional check of power unit starting and operation as follows.

(1) Place all analyzer switches, except motor rotate switch, in the ON or spring-loaded position.

(2) Place power unit controls in normal local operating position with master switch (fig. 2-22) in RUN position. Press in battery charging, turbine engine control, and generator control circuit breakers (fig. 2-22) on pow-

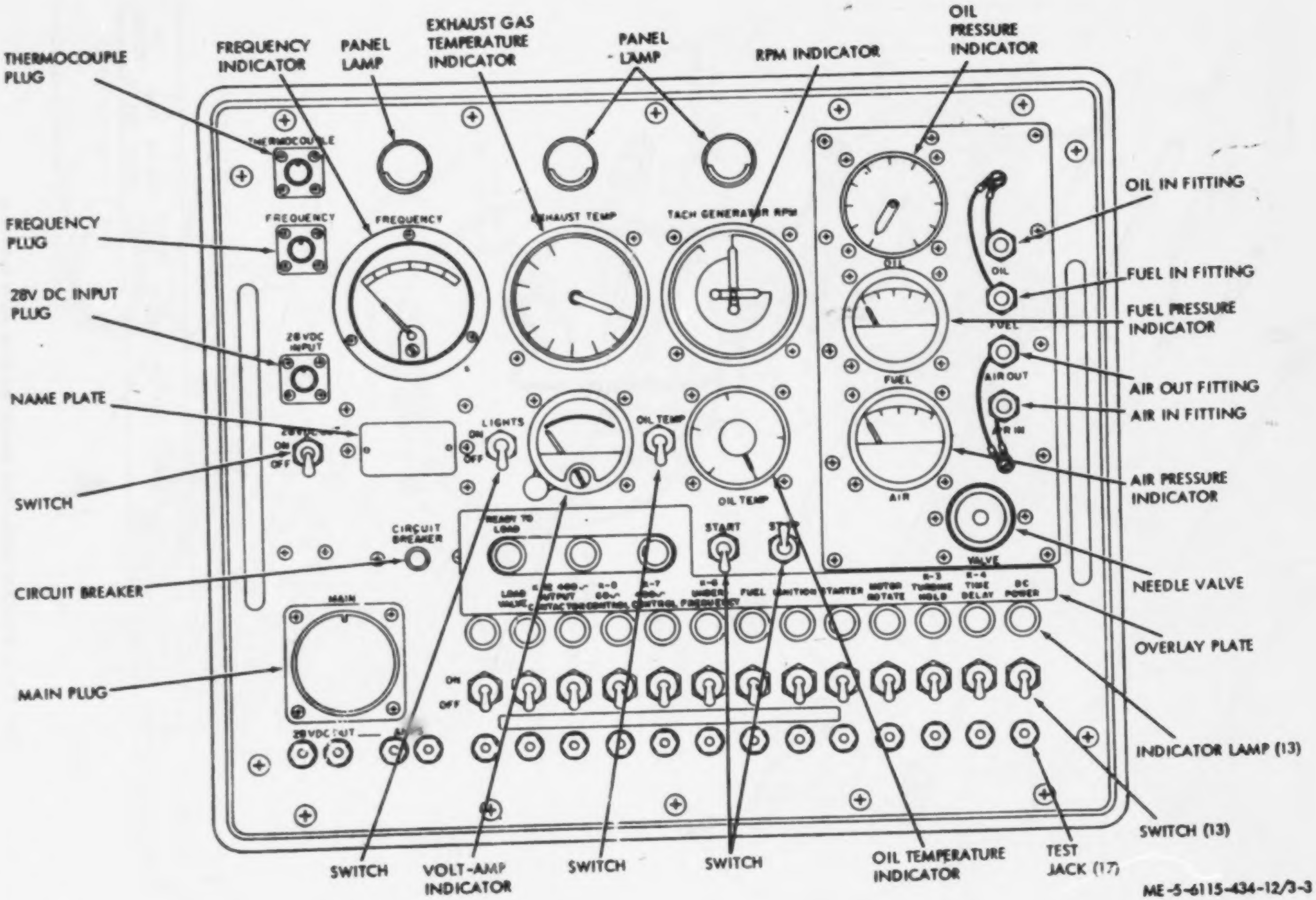
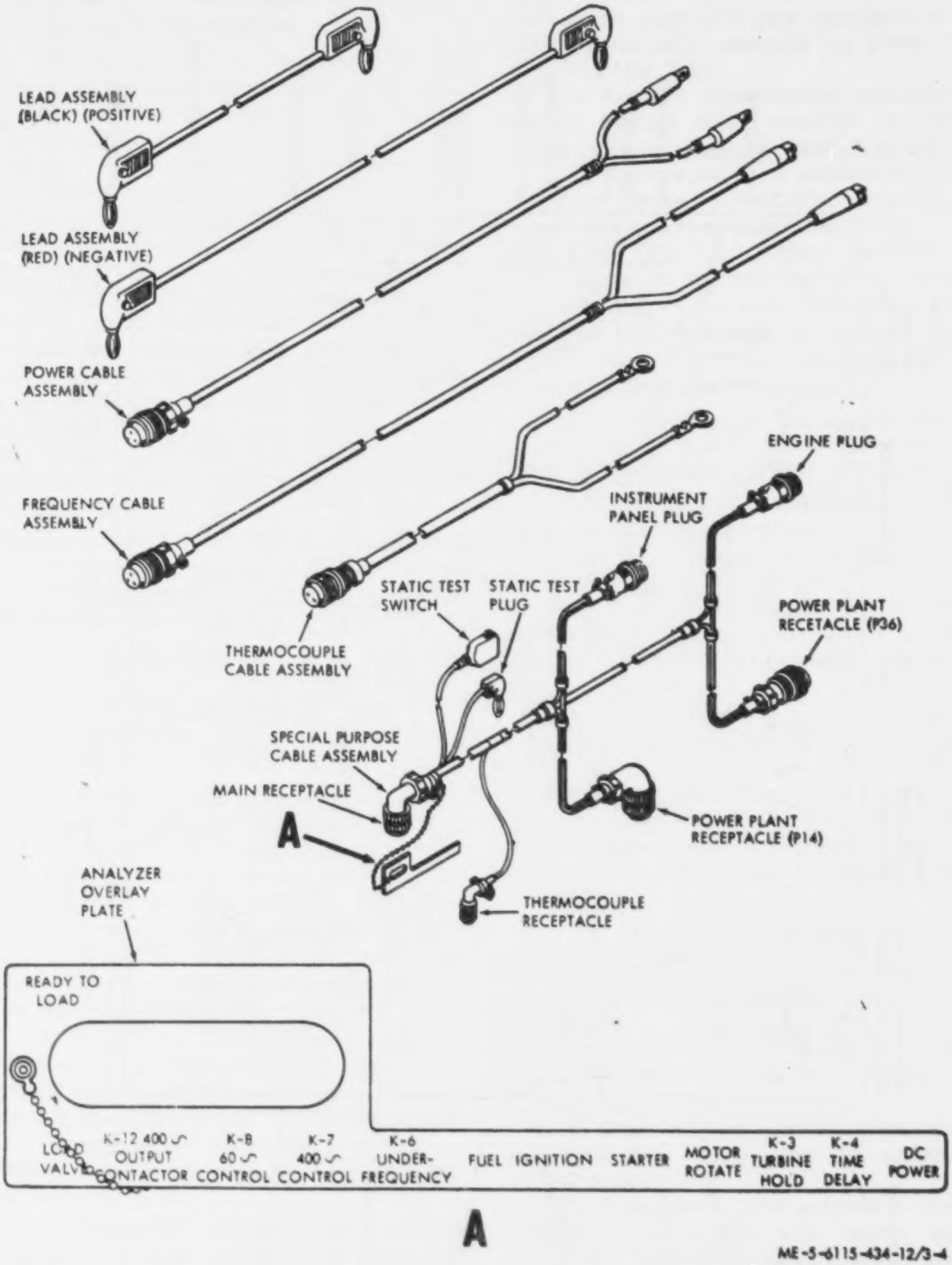

THERMOCOUPLE PLUG
FREQUENCY INDICATOR
PANEL LAMP
EXHAUST GAS TEMPERATURE INDICATOR
PANEL LAMP
RPM INDICATOR
OIL PRESSURE INDICATOR
FREQUENCY PLUG
28V DC INPUT PLUG
NAME PLATE
SWITCH
CIRCUIT BREAKER
MAIN PLUG
OIL IN FITTING
FUEL IN FITTING
FUEL PRESSURE INDICATOR
AIR OUT FITTING
AIR IN FITTING
AIR PRESSURE INDICATOR
NEEDLE VALVE
OVERLAY PLATE
INDICATOR LAMP (13)
SWITCH (13)
TEST JACK (17)
OIL TEMPERATURE INDICATOR
SWITCH
SWITCH
VOLT-AMP INDICATOR
SWITCH
THERMOCOUPLE
FREQUENCY
28 VDC INPUT
FREQUENCY
EXHAUST TEMP
TACH GENERATOR RPM
OIL
FUEL
AIR
AIR OUT
AIR IN
VALVE
LIGHTS
ON
OFF
OIL TEMP
START
STOP
CIRCUIT BREAKER
READY TO LOAD
LOAD VALVE
K-5 400~ OUTPUT CONTACTOR
K-8 60~ CONTROL
K-7 400~ CONTROL
K-6 UNDER FREQUENCY
FUEL
IGNITION
STARTER
MOTOR ROTATE
K-3 TURBINE HOLD
K-4 TIME DELAY
DC POWER
MAIN
28 VDC OUT
ME-5-6115-434-12/3-3

Figure 3-3. Gas turbine engine analyzer control panel with overlay plate.


LEAD ASSEMBLY (BLACK) (POSITIVE)
LEAD ASSEMBLY (RED) (NEGATIVE)
POWER CABLE ASSEMBLY
FREQUENCY CABLE ASSEMBLY
THERMOCOUPLE CABLE ASSEMBLY
STATIC TEST SWITCH
STATIC TEST PLUG
INSTRUMENT PANEL PLUG
ENGINE PLUG
POWER PLANT RECETACLE (P36)
SPECIAL PURPOSE CABLE ASSEMBLY
MAIN RECEPTACLE
A
POWER PLANT RECEPTACLE (P14)
THERMOCOUPLE RECEPTACLE
ANALYZER OVERLAY PLATE
READY TO LOAD
LOAD VALVE
K-12 400 ∿ OUTPUT CONTACTOR
K-8 60 ∿ CONTROL
K-7 400 ∿ CONTROL
K-6 UNDER-FREQUENCY
FUEL
IGNITION
STARTER
MOTOR ROTATE
K-3 TURBINE HOLD
K-4 TIME DELAY
DC POWER
A

ME-5-6115-434-12/3-4

Figure 3-4. Analyzer cables and special purpose cable assembly.

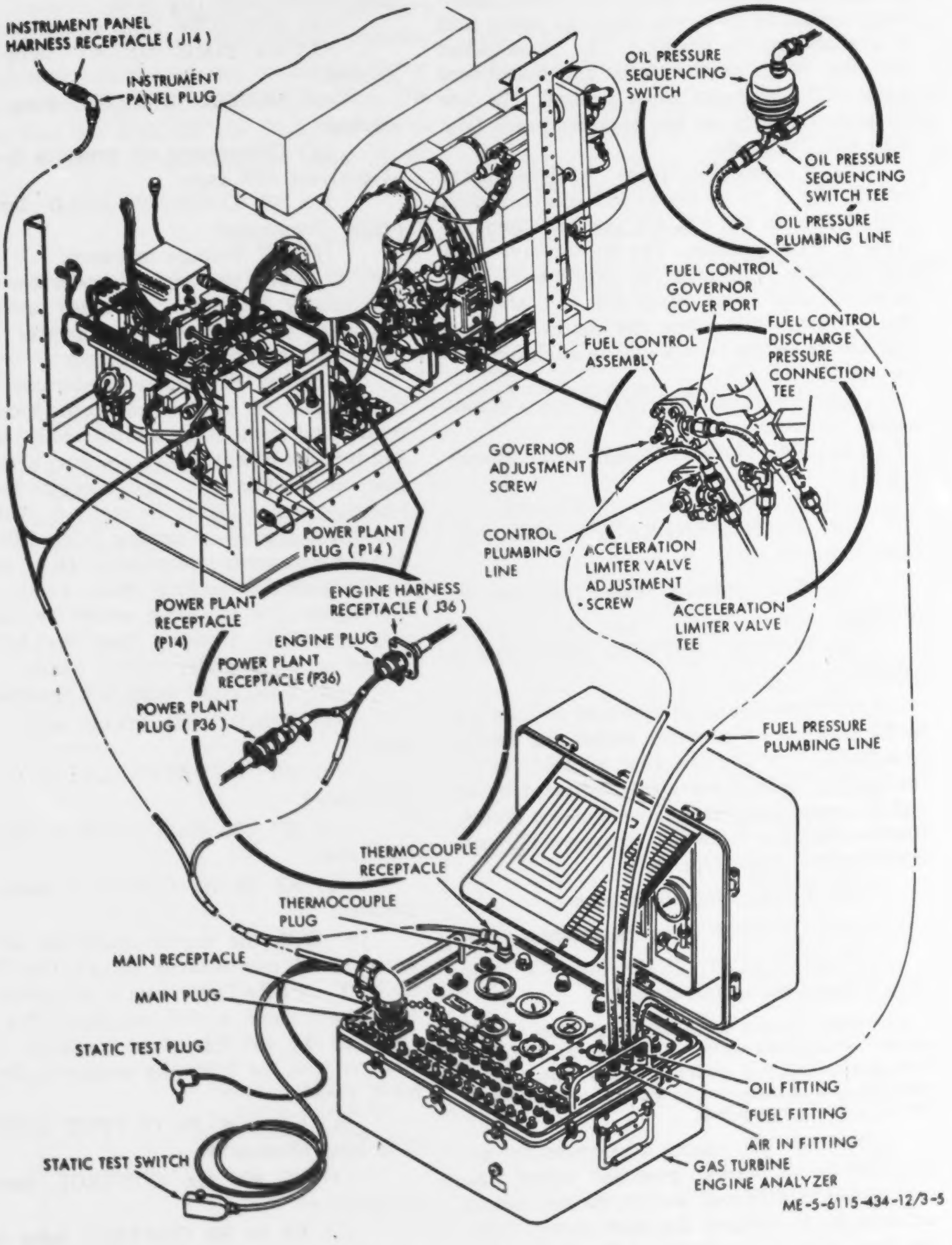

INSTRUMENT PANEL HARNESS RECEPTACLE (J14)
INSTRUMENT PANEL PLUG
OIL PRESSURE SEQUENCING SWITCH
OIL PRESSURE SEQUENCING SWITCH TEE
OIL PRESSURE PLUMBING LINE
FUEL CONTROL GOVERNOR COVER PORT
FUEL CONTROL ASSEMBLY
FUEL CONTROL DISCHARGE PRESSURE CONNECTION TEE
GOVERNOR ADJUSTMENT SCREW
CONTROL PLUMBING LINE
ACCELERATION LIMITER VALVE ADJUSTMENT SCREW
ACCELERATION LIMITER VALVE TEE
POWER PLANT PLUG (P14)
POWER PLANT RECEPTACLE (P14)
ENGINE HARNESS RECEPTACLE (J36)
ENGINE PLUG
POWER PLANT RECEPTACLE (P36)
POWER PLANT PLUG (P36)
FUEL PRESSURE PLUMBING LINE
THERMOCOUPLE RECEPTACLE
THERMOCOUPLE PLUG
MAIN RECEPTACLE
MAIN PLUG
STATIC TEST PLUG
STATIC TEST SWITCH
OIL FITTING
FUEL FITTING
AIR IN FITTING
GAS TURBINE ENGINE ANALYZER
ME-5-6115-434-12/3-5

Figure 3-5. Connecting analyzer to power unit.

er unit instrument panel. The dc power lamp on the analyzer panel (fig. 3-3) should illuminate, indicating dc power from the power unit is available at the analyzer. The press-to-test indicator lamps on the power unit instrument panel will illuminate when pressed. The low oil pressure lamp on the analyzer panel (fig. 3-3) will illuminate.

(3) Momentarily place analyzer start switch (fig. 3-3), or power unit master switch (fig. 2-22), in the START position then release to RUN position. The start relay (K1) will actuate, indicated by audible clicking noise, the fuel boost pump will run, and the starter motor will rotate the engine. Observe that the following occurs on the analyzer control panel (fig. 3-3).

(*a*) K3 TURBINE HOLD lamp illuminates.

(*b*) K4 TIME DELAY lamp illuminates.

(*c*) STARTER lamp illuminates.

(*d*) TACH GENERATOR RPM indicator indicates rpm.

(*e*) OIL pressure gage indicates oil pressure.

(*f*) MOTOR ROTATE lamp illuminates.

(4) When rising oil pressure reaches 2.5 to 3.5 psig the oil pressure sequencing switch is actuated, opening the fuel solenoid valve; the ignition unit is energized, indicated by an audible cracking noise. and combustion occurs. Observe that the following occurs on the analyzer control panel (fig. 3-3).

(*a*) FUEL lamp illuminates.

(*b*) IGNITION lamp illuminates.

(*c*) EXHAUST TEMP indicator indicates exhaust gas temperature.

Note. Engine acceleration rate may be controlled by adjusting CONTROL AIR VALVE (fig. 3-3) to bleed off fuel control assembly control air to slow the rate of acceleration during observation of the various actuation points.

(5) When the engine accelerates to approximately 35 percent governed speed, the centrifugal multi-speed switch starter cutout actuates to de-energize the start relay (K1), the time delay relay (K4) and the start motor. Observe that the following occurs on the analyzer control panel (fig. 3-3).

(*a*) STARTER lamp extinguished.

(*b*) K4 TIME DELAY lamp extinguished.

(*c*) MOTOR ROTATE lamp extinguished.

(*d*) Compressor air pressure is evident at analyzer AIR gage.

(*e*) K3 TURBINE HOLD lamp remains illuminated.

(*f*) DC Voltage increases.

(6) When the engine accelerates to approximately 75 percent governed speed, the OIL gage (fig. 3-3) on the analyzer control panel will indicate 90 ± 10 psig.

(7) When the engine accelerates to approximately 95 percent governed speed, the centrifugal multi-speed switch ready to load and ignition cutout switch actuates to de-energize the ignition unit, and energize the time totalizing meter (M1), the ready to load lamp, the under frequency arming relay (K6), the 400 Hz generator control relay (K7), and the 60 Hz generator control relay (K8). Check the engine time totalizing meter for satisfactory operation. Observe that the following occurs on the analyzer control panel.

(*a*) IGNITION lamp extinguished.

(*b*) READY TO LOAD lamp illuminated.

(*c*) K6 UNDERFREQUENCY lamp illuminated.

(*d*) K7 400 Hz CONTROL lamp illuminated.

(*e*) K8 60 Hz CONTROL lamp illuminated.

(8) With the engine operating at governed speed, momentarily actuate the EMERGENCY OPERATION switch on power unit instrument panel to ON position. This is a check on the 400 Hz output contactor (K12). Observe that the following occurs on the analyzer panel.

(*a*) K12 400 Hz OUTPUT CONTACTOR lamp illuminates.

(*b*) K7 400 Hz CONTROL lamp is extinguished.

(*c*) K8 60 Hz CONTROL lamp is extinguished.

(9) The 400 HZ OUTPUT CONTACTOR (K12) may be checked by an alternate method. Place 400 Hz system main contactor switch and output contactor switch on power unit instrument panel in CLOSE position. Observe that the K12 400 Hz OUTPUT CONTACTOR lamp on the analyzer panel illuminates.

(10) Actuate STOP switch on analyzer panel or place MASTER switch on power unit instrument panel in STOP position and observe that the engine shuts down.

Note. Sequence of events during performance check, table 3-5, may be utilized during the functional check procedure to determine the sequence of events, and as an aid in isolating failures.

Table 3-5. Sequence of events during performance check

Note. Turn on the following switches on analyzer. DC power, K-4 time delay, K-3 turbine hold, starter, ignition, fuel, K-6 under-frequency and load valve. Perform the following steps and observe analyzer and power unit indications.

Step	Condition	Power unit indication	Analyzer indication	Remarks
1	Battery connected.		Panel lamps illuminate.	If not, circuit breaker (CB1) failed, or battery dead.
2	Air intake doors open.		DC power lamp illuminates.	If not, air intake door switch (S4) failed.
3	Power unit instrument panel master switch (S1) in RUN position.	Instrument panel indicator lamps will push to test. If not, master switch (S1) failed.		
4	Power unit instrument panel master switch (S1) in START position.		K3 turbine hold lamp illuminated.	If not, 400 Hz main contractor switch not in open position or failed, or 60 Hz load contactor failed, master switch (S1) failed, under frequency arming relay (K6) normally closed contacts open, or centrifugal multi-speed switch assembly 110 percent switch open.
			K4 time delay lamp illuminated.	If not, open centrifugal multi-speed switch assembly 35 percent switch open.
			Starter lamp illuminated.	If not, time delay (K4) contacts open.
		Start relay (K1) actuates. (Listen for audible clicking sound of relay.)		If not, press analyzer panel start switch—if start relay (K1) actuates, master switch (S1) failed.
				If start relay (K1) still does not actuate, start relay (K1) failed.

Table 3-5. Sequence of events during performance check—Continued

Step	Condition	Power unit indication	Analyzer indication	Remarks
4	Power unit instrument panel master switch (S1) in START position—Continued	Starter rotates engine.		If not, start relay (K1) contacts failed, or starter motor (B1) failed.
		Turbine hold relay (K3) actuates, fuel boost pump runs.		If not, turbine hold relay (K3) failed, or fuel boost pump failed.
5	Release power unit control panel master switch to RUN position.	Starter continues to rotate engine.		If not, start relay (K1) holding contacts failed or time delay relay (K4) actuates too soon (60 sec. time delay).

Caution: **The analyzer start switch and motor rotate switch bypass the multispeed centrifugal switch assembly 35 percent switch.**

Step	Condition	Power unit indication	Analyzer indication	Remarks
			K3, and/or K4 lamps extinguished.	Time delay relay (K4) contacts failed, or turbine hold relay (K3) failed.
		Fuel boost pump continues to run.		If not, turbine hold relay (K3) contacts failed.
6	Unit reaches approximately 10 percent governed speed, oil pressure sequencing switch actuates.	Fuel solenoid valve opens.	Fuel lamp illuminates.	If not, no oil pressure, or oil pressure sequencing switch failed. If not, fuel solenoid valve failed.

Note. Fuel switch on analyzer will not interrupt power to solenoid.

Step	Condition	Power unit indication	Analyzer indication	Remarks
			Ignition lamp illuminated.	If not, centrifugal multi-speed switch assembly 95 percent switch failed, or under frequence arming relay (K6) contacts failed.
		Ignition on. (Listen for audible cracking sound of ignition.)		If not, ignition unit failed.
			Fuel flows through primary fuel atomiser (flow divider blocks secondary flow).	
7	Engine lights off.		Exhaust gas temperature increases.	If not, improper acceleration limiter valve crack pressure, improper fuel spray (Atomizer-flow Divider), or obstructed air flow through engine.

Table 3-5. Sequence of events during performance check—Continued

Step	Condition	Power unit indication	Analyzer indication	Remarks
8	Engine continues acceleration.		Control air pressure increases as follows: Approximately 2 psig at 25 percent governed speed, approximately 8 psig at 50 percent governed speed, approximately 32 psig at 100 percent governed speed.	If not, control air line leak, clogged control air pickup orifice, or faulty acceleration thermostat. Place finger over fuel control drain outlet, if control air pressure increases, acceleration limiter valve diaphragm failed.
			Fuel Pressure increases.	If not, insufficient fuel supply or fuel control malfunction.
			Exhaust Gas Temperature increases.	If temperature drops off to less than 200°C (392°F) fuel atomizer may be clogged. If temperature remains high but engine does not accelerate, generator or other accessory may have failed. Compressor or Turbine rub or plenum air leak, starter failure or low charged batteries.
			Engine oil pressure reaches approximately 45 psig.	
		Low oil pressure switch actuates.	No indication.	If not, engine will shut down at 95 percent governed speed.
10	Engine reaches 35 percent governed speed		K4 time delay and starter lamps extinguish.	If not, centrifugal multi-speed switch assembly 35 percent switch failed.
		Start relay (K1) de-actuates and start motor de-actuates.	DC voltage increases.	If not, start relay (K1) stuck closed.
11	Engine reaches 95 percent governed speed.	Centrifugal multi-speed switch assembly 95 percent switch actuates.		
		Ready to load lamp illuminates.	Ready to load and K6 under frequency lamps illuminate.	If not, centrifugal multi-speed switch assembly 95 percent switch failed.
		Ignition unit de-energized.	Ignition lamp extinguishes.	
		Hourmeter activated.		If not, circuit breaker (CB-4) tripped, or hourmeter failed.

Table 3-5. Sequence of events during performance check—Continued

Step	Condition	Power unit indication	Analyser indication	Remarks
11	Engine reaches 95 percent governed speed —Continued	Under frequency arming relay (K6) energizes to open circuit which bypasses low oil pressure switch during starting.		If not, diode (CR8) failed, or under frequency arming relay (K6) failed.
		Engine continues to run.		If not, low oil pressure switch failed to actuate.
			K7 400 lamp illuminates (K7 does not energize—no ground).	If not, under frequency arming relay (K6) contacts open, emergency switch (S5) contacts open or 400 Hz main contactor switch (S2) contacts open.
			K8 load contactor lamp illuminates (K8 does not energize—no ground).	If not, under frequency arming relay (K6) contacts open, emergency switch (S5) contacts open or 400 Hz main contactor switch (S3) contacts open.
12	Engine speed reaches about 102 percent governed speed (408 cps—governor controls speed or engine).		Fuel pressure drops to about 120—150 psi.	If not, and engine continues to accelerate to 110 percent and shuts off, governor malfunctioned.
				If not, and fuel pressure high, but engine operates slightly low in speed, and turbine temperature about 275–310°C (530 to 590°F) fuel atomizer or flow divider clogged.
				If not, and fuel pressure high and turbine discharge temperature more than 325°C (615°F) compressor or turbine rub, generator or other accessory failed, or plenum air leak.
		Exhaust gas temperature about 270°C—320°C (518°F—608°F) (Normal no-load exhaust gas temperature.)		If not, check exhaust gas temperature indicator calibration and circuit resistance (8 ohms).
		Control air pressure approximately 33 psig (depending on ambient conditions and load).		If not, check for control air leak in lines, ruptured acceleration limiter diaphragm, or thermostat.

Table 3-5. Sequence of events during performance check—Continued

Step	Condition	Power unit indication	Analyzer indication	Remarks
12	Engine speed reaches about 102 percent governed speed (408 cps – governor controls speed of engine)—Continued			If not, control air inlet orifice clogged.
			Oil pressure 80 to 100 psig.	If not, low oil quantity, pressure relief valve set low, oil pump failure, or oil filter dirty.
13	Place 400 Hz main contactor switch (S2) in CLOSE position.	Auxiliary stand—by start relay (K5) energized (to prevent standby start signal).	No indication	If not, auxiliary standby start relay (K5) failed or 400 Hz main contactor switch (S2) contacts failed.
		400 Hz Main contactor relay (K10) energizes, to supply voltage to environmental control system components.	No indication.	If not, power unit control panel trip indicator lamp extinguished, diode (CR6) failed, underfrequencing arming relay (K6) contacts failed, 400 Hz generator control relay (K7) contacts failed, 400 Hz generator control relay (K7) actuated by generator fault, or 400 Hz main contactor relay (K10) failed.
		400 Hz auxiliary main contactor relay (K9) energizes.	No indication.	If not, power unit control panel 400 Hz main contactor switch (S2) failed, 400 Hz main contactor relay (K10) contacts failed, 400 Hz auxiliary main contactor relay (K9) relay failed.
		Environmental control system can be operated.		If not, 400 Hz auxiliary main contactor relay (K9) contacts failed or circuit breaker (CB5) failed.
		Hot water power supply armed. 400 Hz output contactor switch (S9) armed.		
14	Place 400 Hz output contactor switch in RESET position and hold.		K12 400 output contactor lamp illuminates.	If not, 400 Hz output contactor switch (S9) defective. Overload sensing control switch S10A S10B or S10C open.
		400 Hz output contactor relay (K12) energizes (indicated by no voltage from pin 1 positive to pin 2 negative standby receptacle J1).		If not, standby start relay (K2) failed.

Table 3-5. Sequence of events during performance check—Continued

Step	Condition	Power unit indication	Analyzer indication	Remarks
14	Place 400 Hz output contractor switch in RESET position and hold —Continued	400 Hz ac convenience receptacle and power output receptacles energized.		
15	Release 400 Hz output contactor switch.	400 Hz main contactor relay (K10) remains energized.	K12 400 output contactor lamp stays illuminated.	If not, and environmental control components are also deenergized, there is probably a generator fault signal produced by connection of 400 Hz load. If not, but environmental control components remain energized, probably 400 Hz contactor switch (S9) failed or contacts of 400 Hz output contactor relay (K12) failed.

e. Adjustments.

(1) *Acceleration and overtemperature control thermostat.* If acceleration and overtemperature control thermostat (fig. 3-9) is replaced, or if controlling temperature is not as specified, check and adjust as follows.

(*a*) Connect gas turbine engine analyzer to power unit as described in paragraph 3-8*b* above except paragraph 3-8*b*(6) above.

(*b*) Disconnect line from load control thermostat (fig. 3-24). Connect a control air plumbing line from the load control thermostat line to the AIR IN fitting on the analyzer panel. Open needle valve on analyzer panel (fig. 3-3).

(*c*) Remove cap from acceleration limiter valve tee. Connect the 0—100 psig gage set, provided with the analyzer, to the open leg of the tee.

(*d*) Open conditioned air outlet compartment access door (fig. 1-2) and refrigeration compartment access door (fig. 1-1).

(*e*) Start engine and accelerate to no-load governed speed. Operate at this speed for approximately two minutes to stabilize operation.

(*f*) Operate both heated air systems at full heat as described in paragraph 2-16*d*.

(*g*) With heated air systems operating at full heat, place the mode select switch to COOL on both systems. The heated air flow control valves will remain open but the engine load control valve will close. Open the engine load control valve by installing a jumper between analyzer jacks identified LOAD VALVE and DC POWER. This condition delivers both cooled air and heated air at the same time to provide sufficient engine load to raise exhaust gas temperature to 671°C to 682°C (1240°F to 1260°F) for checking the thermostat setting.

Caution: **This bypasses the overtemperature thermoswitches in the air out compartment. Monitor the air out temperature and shut down the power unit if air discharge temperature exceeds 93°C (200°F).**

(*h*) With engine operating at full bleed load, slowly close needle valve (fig. 3-3) on gas turbine engine analyzer panel until the AIR IN pressure gage (fig. 3-3) drops to approximately 14 psig. The exhaust gas temperature at which engine speed and fuel pressure start to decrease is the acceleration and overtemperature control thermostat controlling temperature.

***Caution:* Do not permit exhaust gas temperature to exceed 682°C (1260°F).**

(*i*) If controlling temperature is not 671°C to 682°C (1240° to 1260°F) shut down power unit and adjust thermostat as follows. (fig. 3-9).

(*j*) Remove thermostat as described in removal procedure, paragraph 3-26*a*. Remove thermostat valve assembly (fig. 3-9) and shims from thermostat body.

(*k*) Measure total thickness of shims (fig. 3-9) with micrometer. Add or remove shims as required. To decrease temperature setting, increase shim stack thickness. To increase temperature setting decrease shim stack thickness. A change of 0.001 inch in shim stack thickness will change controlling temperature by approximately 30°F. Install corrected thickness of shims and fitting.

(*l*) Reinstall thermostat as described in installation procedure paragraph 3-26*b*.

(*m*) Recheck controlling temperature at least twice. When controlling temperature is satisfactory, reconnect load control thermostat line to load control valve (fig. 3-24). Disconnect and remove gas turbine engine analyzer.

(2) *Load control thermostat*. If load control thermostat (fig. 3-24) is replaced, or if controlling temperature is not as specified, check and adjust as follows.

(*a*) Connect gas turbine engine analyzer to power unit as described in paragraph 3-8*b* above.

(*b*) Load engine as described in steps *e*(1)(*e*), (*f*) and (*g*) above.

(*c*) Observe engine exhaust gas temperature on analyzer. The load control thermostat should modulate the load control valve to control exhaust gas temperature at 552°C to 579°C (1025°F to 1075°F). If control temperature is not 552°C to 579°C (1025°F to 1075°F), shutdown power unit and adjust thermostat as follows.

(*d*) Remove thermostat as described in removal procedure (para 3-73*a*).

(*e*) Remove thermostat valve assembly (fig. 3-24) and shims from thermostat body.

(*f*) Measure total thickness of shims with micrometer. To decrease temperature setting, increase shim stack thickness. To increase temperature setting, decrease shim stack thickness. A change of 0.001 inch in shim stack thickness will change cracking temperature by approximately 30°F. Add or remove shims as required. Install corrected thickness of shims and fitting.

(*g*) Reinstall thermostat as described in paragraph 3-73*b*.

(*h*) Recheck controlling temperature at lease twice.

(*i*) When controlling temperature is satisfactory, shut down power unit and disconnect and remove analyzer.

(3) *Fuel control assembly acceleration limiter valve cracking pressure adjustment.* If the fuel control assembly (fig. 3-8) is replaced, or if the acceleration limiter valve cracking pressure is not within specified limits. Check and adjust as follows.

(*a*) Disconnect connector (fig. 1-5) from oil pressure sequencing switch (fig. 1-5) to prevent lightoff, with pressure at the limiter valve.

(*b*) Disconnect fuel line from tee (fig. 3-5) at fuel control assembly outlet point and install a 0 to 100 psig pressure gage.

(*c*) Disconnect control air line (fig. 3-5) at acceleration limiter valve tee (fig. 3-5).

(*d*) With fuel supplied to fuel control assembly at 15 psig, move master switch (S1) (fig. 2-22) on power unit instrument panel assembly to START position and motor engine.

***Caution:* Do not exceed starter motor duty cycle.**

(*e*) While motoring unit, check cracking pressure. Cracking pressure should be 44 ± 1 psig. To adjust hold acceleration limiter valve adjustment screw (fig. 3-5) on fuel control assembly and loosen locknut. Adjust screw position using screwdriver and wrench assembly (special tools). To increase cracking pressure turn acceleration limiter valve adjustment screw (fig. 3-5) clockwise. To decrease pressure, turn acceleration limiter valve adjustment screw (fig. 3-5) counterclockwise.

Caution: **Do not turn screw more than three full turns in either direction.**

(*f*) When satisfactory cracking pressure is attained, tighten locknut.

(*g*) Reconnect control air pressure line (fig. 3-5) to acceleration limiter valve. Remove gage from tee (fig. 3-5) on fuel control assembly, reconnect fuel line (fig. 3-5), disconnect and remove gas turbine engine analyzer. Replace connector on oil pressure sequencing switch (fig. 1-5).

(4) *Fuel control assembly governor speed setting.* If fuel control assembly (fig. 3-8) is replaced or if engine speed at full load or at no-load is not as specified, check and adjust as follows.

(*a*) Connect gas turbine engine analyzer to power unit as described in paragraph 3-8*b*. Use tach-generator rpm gage (fig. 3-3) on analyzer panel to check engine speed.

(*b*) Start engine (para 3-8*d*) and accelerate to no-load governed speed. Operate at this speed for approximately two minutes to stabilize operation.

(*c*) Apply full load to engine. To apply load, open compressor air outlet as described in paragraph 2-15*f*, and operate cooled air system as described in paragraph 2-15*c*.

(*d*) With engine operating at full load, tach-generator rpm gage (fig. 3-3) should read 4150 ± 10 rpm (equal to an engine speed of 40,700 ± 100 rpm).

(*e*) If tach-generator rpm gage (fig. 3-3) does not read 4150 ± 10 rpm use screwdriver and wrench assembly (special tools) to adjust full-load governed speed.

(*f*) Hold governor adjustment screw (fig. 3-5) on fuel control assembly and loosen locknut. Turn governor adjustment screw (fig. [illegible] full load governed speed, turn governor adjustment screw (fig. 3-5) counterclockwise to decrease [illegible] governed speed. When adjustment is satisfactory, tighten locknut.

Caution: **Do not turn screw more than three turns in either direction.**

(*g*) Close compressor air outlet as described in paragraph 2-15*f*, shut off cooled air system as described in paragraph 2-15. and return the engine to no-load governed speed.

(*h*) Tach-generator rpm gage (fig. 3-3) should read 4242 rpm (maximum) (equal to an engine speed of 41,600 rpm).

(*i*) If tach-generator rpm gage does not read 4242 rpm (maximum), use screwdriver and wrench assembly (special tools) to adjust no-load governed speed setting.

(*j*) Hold governor adjustment screw (fig. 3-5) on fuel control assembly and loosen locknut. Turn adjustment screw clockwise to increase no-load governed speed; turn adjustment screw counterclockwise to decrease no-load governed speed.

Caution: **Do not turn adjustment screw more than three full turns in either direction.**

(*k*) When adjustment is satisfactory, tighten locknut, disconnect and remove gas turbine engine analyzer.

(5) *Air pressure regulator.* If air pressure regulator (fig. 3-24) is replaced or if controlling air pressure is not as specified, check and adjust as follows.

(*a*) Disconnect outlet air pressure line (fig. 3-24) from air pressure regulator and connect a line between air pressure regulator outlet port and AIR IN connection (fig. 3-3) on gas turbine engine analyzer.

(*b*) Start and accelerate engine to no-load governed speed. Read air pressure regulator outlet pressure on AIR gage (fig. 3-3) on analyzer panel.

(*c*) Air pressure regulator outlet pressure shall be 19.0 to 20.0 psig.

(*d*) If pressure is not as specified, shut down engine. Loosen locknut on end of air pressure regulator (fig. 3-24) and turn adjustment screw clockwise to increase outlet pressure. Tighten locknut.

[illegible] Repeat check procedure [illegible] factory, [illegible] and remove gas turbine engine analyzer.

(6) *Centrifugal Multi-Speed Switch Setting.* If the centrifugal multi-speed switch (fig. 3-15) is replaced or if settings are not as specified, check and adjust as follows.

(*a*) Connect gas turbine engine analyzer (fig. 3–5) to power unit as described in paragraph 3–8*b* above. Control engine speed with valve (fig. 3–3) on analyzer panel.

(*b*) Use tach-generator rpm gage (fig. 3–8) on analyzer panel to read engine speed.

(*c*) Start and operate engine as described in paragraph 3–8*d* above checking for switch actuation of centrifugal multi-speed switch.

(*d*) If 35 percent switch requires adjustment, remove cover plate from centrifugal multi-speed switch (fig. 3–15) and adjust position of top screw (screw farthest from switch receptacle). Replace cover plate and recheck switch setting at least twice.

Note. If 35 percent switch setting is changed, the settings of 95 percent speed switch and overspeed (110 percent) switch must be checked.

(*e*) If 95 percent speed switch requires adjustment, remove cover plate from centrifugal multi-speed switch and adjust position of middle screw. Replace cover plate and recheck switch setting at least twice.

(*f*) To check actuation of overspeed (110 percent) switch, use screw driver and wrench assembly (special tools); loosen locknut and turn fuel control assembly governor adjusting screw two full turns clockwise to increase governor setting. Start engine and use needle valve (fig. 3–3) on analyzer panel to slowly accelerate to overspeed condition. Overspeed (110 percent) switch should actuate to shut down engine at 4512 ± 25 tach-generator rpm reading (equal to an engine speed of 44, 250 ± 250 rpm).

(*g*) If overspeed (110 percent) switch required adjustment, remove cover plate and adjust position of bottom screw (screw nearest to receptacle). Replace cover plate and recheck switch setting at least twice.

(*h*) When all switch settings are satisfactory, reset fuel control assembly governor screw to original position.

(*i*) Recheck fuel control assembly governor setting as described in paragraph 3–8*e* (4), above.

(*j*) When centrifugal multi-speed switch checks and fuel control assembly governor setting checks are satisfactory, disconnect and remove gas turbine engine analyzer.

Section V. FIELD EXPEDIENT REPAIRS

3–9. General

Organizational maintenance troubles may occur while the power unit is operating in the field where supplies and repair parts are not available and normal corrective action cannot be performed. When this condition exists, the following expedient repairs may be used in emergencies, upon the decision of the unit commander. Equipment to be repaired must be removed from operation as soon as possible and properly repaired before being placed in operation again.

3–10. Repairs

a. Start Relay (K1) failure (fig. 3–20).

(1) If start relay (K1) fails, remove K1 and battery transfer contactor (K33) as described in paragraphs 3–62*a* and 3–62*d*. Replace K1 relay with K33 relay.

(2) If start relay (K1) fails to energize, utilize a number 2 wire and jumper across terminals A1 and A2. After gas turbine engine lights off and reaches approximately 35 percent governed speed, jumper may be removed.

Warning: **Use an insulated number 2 wire to jumper across terminals A1 and A2 on the start relay (K1). High voltage may cause serious injury or death to personnel.**

b. Door Interlock Switch Failure (S4) (S27) (S28) (S33) (S34). Disconnect harness from door interlock switch and place jumper across harness terminals. Fasten door securely open. When run is completed, remove jumper and door fastenings.

c. Relay Failure (K11, K12, K19, K20, K27, K43A, K43B). All the above named relays are interchangeable and any one may be substituted for the other, depending upon the immediate output requirements of the power unit. Remove the failed relay and substitute the least likely to be used relay.

d. Cold Water Pressure Switch Failure (S13). If cold water pressure switch (S13) fails in the open position, jumper across the contacts on the switch allowing the pump to run continuously.

e. Hot Water Pump Control Pressure Switch Failure (S11). If hot water pump control pressure switch (S11) fails in the open position jumper across the contacts on the switch, allowing the pump to run continuously.

Section VI. RADIO INTERFERENCE SUPPRESSION

3-11. General Methods Used to Attain Proper Suppression

Essentially, suppression is attained by providing a low resistance path ground for the stray currents. The methods used include the ignition and high frequency wires, grounding the frame with bonding straps, and using capacitors and resistors.

3-12. Interference Suppression Components

a. Primary Suppression Components. The primary suppression components are those whose primary function is to suppress radio interference. These components are illustrated in figure 3-6.

b. Secondary Suppression Components. These components have radio interference suppression functions which are incidental or secondary to their primary function.

3-13. Replacement of Suppression Components

Refer to figure 3-6 and replace the radio interference suppression components.

3-14. Testing of Radio Interference Suppression Components

Test the capacitors for leaks and shorts on a capacitor tester; replace defective capacitors. If test equipment is not available and interference is indicated, isolate the cause of interference by the trial-and-error method of replacing each capacitor in tune until the cause of interference is located and eliminated.

Section VII. FUEL SYSTEM

3-15. General

The fuel system provides a metered fuel supply to automatically control the acceleration and operation of the engine. The electrically operated fuel boost pump draws fuel from an external fuel supply, through an external fuel system filter assembly, and supplies fuel under constant pressure, through a second filter, to the engine fuel control unit. The fuel control unit provides controlled fuel flow through the electrically actuated fuel solenoid valve to the fuel atomizer. The fuel atomizer provides a fuel spray pattern for combustion in the combustion chamber liner assembly.

Note. Access to the fuel system components is obtained by removing the fuel and oil components access panel (fig. 1-1) and the gas turbine engine power plant access panel (fig. 1-2).

3-16. Tube Assemblies, Hose Assemblies, Clamp, and Plumbing Fittings

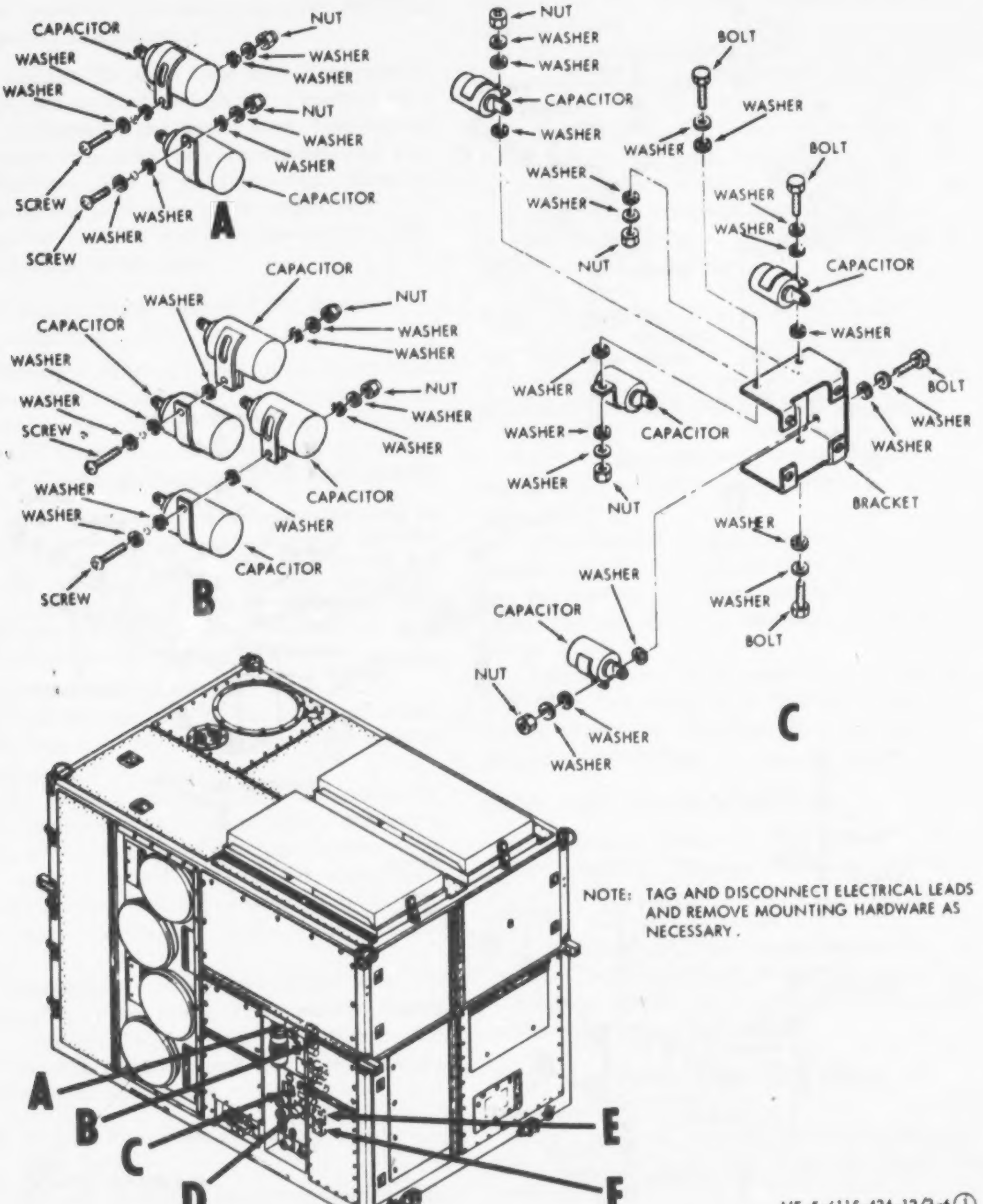
a. Removal. Remove tube assemblies, hose assemblies, clamps, and plumbing fittings as required for access to other components or to replace damaged parts.

Note. Tag or otherwise identify connection points, routing, orientation of fittings, and location of supporting clamps for aid at assembly.

b. Cleaning and Inspection.

(1) Clean tube assemblies, hose assemblies, clamps, and plumbing fittings with an approved cleaning solvent and dry thoroughly with filtered compressed air.

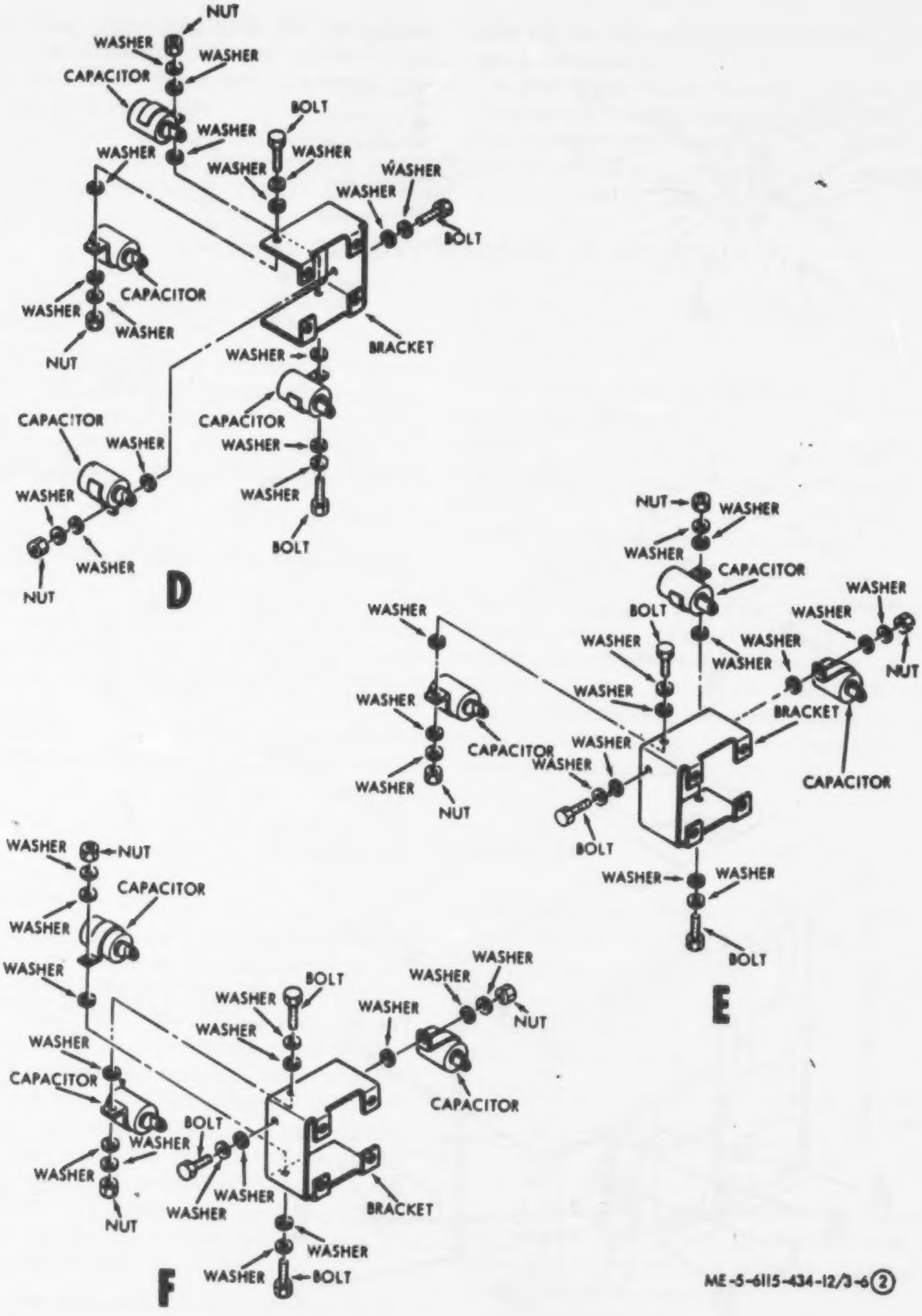
(2) Visually inspect for cracks, corrosion, abrasion, damaged threads, or other evidence of damage. Replace all damaged parts.


CAPACITOR
WASHER
WASHER
SCREW
SCREW
WASHER
WASHER
NUT
WASHER
WASHER
NUT
WASHER
WASHER
CAPACITOR
A
CAPACITOR
WASHER
CAPACITOR
WASHER
WASHER
SCREW
WASHER
WASHER
SCREW
NUT
WASHER
WASHER
NUT
WASHER
WASHER
CAPACITOR
WASHER
CAPACITOR
B
NUT
WASHER
WASHER
CAPACITOR
WASHER
BOLT
WASHER
WASHER
BOLT
WASHER
WASHER
NUT
WASHER
WASHER
CAPACITOR
WASHER
WASHER
CAPACITOR
WASHER
WASHER
NUT
BOLT
WASHER
WASHER
BRACKET
WASHER
WASHER
BOLT
WASHER
CAPACITOR
NUT
WASHER
WASHER
C
A
B
C
D
E
F

NOTE: TAG AND DISCONNECT ELECTRICAL LEADS AND REMOVE MOUNTING HARDWARE AS NECESSARY.

ME-5-6115-434-12/3-6 ①

Figure 3-6. Radio interference suppression components (Sheet 1 of 2).


NUT
WASHER
WASHER
CAPACITOR
BOLT
WASHER
WASHER
WASHER
WASHER
WASHER
WASHER
BOLT
CAPACITOR
WASHER
WASHER
NUT
BRACKET
WASHER
CAPACITOR
CAPACITOR
WASHER
WASHER
WASHER
WASHER
WASHER
NUT
BOLT
D
NUT
WASHER
WASHER
CAPACITOR
WASHER
BOLT
WASHER
WASHER
WASHER
WASHER
WASHER
NUT
WASHER
BRACKET
WASHER
CAPACITOR
CAPACITOR
WASHER
WASHER
WASHER
WASHER
NUT
BOLT
CAPACITOR
WASHER
WASHER
BOLT
E
WASHER
NUT
CAPACITOR
WASHER
WASHER
BOLT
WASHER
WASHER
WASHER
WASHER
WASHER
NUT
WASHER
CAPACITOR
BOLT
WASHER
CAPACITOR
WASHER
WASHER
WASHER
NUT
BRACKET
WASHER
WASHER
BOLT
F

ME-5-6115-434-12/3-6②

Figure 3-6. Radio interference suppression components (Sheet 2 of 2).

c. Installation. Install tube assemblies, hose assemblies, clamps, and plumbing fittings in reverse order of removal using new packings and gaskets as applicable.

Caution: **Be sure tube and hose assemblies do not make direct physical contact with other surfaces of the power unit. Use clamps to support tube and hose assemblies and prevent contact. The high frequency vibration of the power unit may cause rapid wear and damage to the tube and hose assemblies leading to failure of the parts.**

3–17. External Fuel System Filter Elements (fig. 3–7)

a. Removal. Shut off fuel supply to external fuel system filter assembly. Remove eight nuts, washers, and bolts. Separate retaining rings and filter cases from support stand. Remove and discard filter elements and gaskets.

Note. If it becomes necessary to clean and replace filter elements while power unit is in operation and it is not desirable or possible to shut off fuel supply to fuel system filter assembly, use bypass valve on filter assembly to shut off fuel to each filter, individually. Follow procedure described in paragraph 3–17 to remove individual filters.

b. Cleaning and Inspection.

(1) Wash parts with an approved cleaning solvent and dry thoroughly with filtered compressed air.

(2) Visually inspect filter case, retaining rings, and support stand for corrosion, cracks, or other obvious damage. Inspect nuts, bolts, and plumbing fittings for damage to threads. Inspect drain petcocks in bottom of filter cases for damage. Replace all damaged parts.

c. Installation. Install new filter elements and gaskets in reverse order or removal procedure. Connect fuel supply to external fuel filter assembly and check for fuel leakage. There must be no leakage.

3–18. Engine Fuel Filter Assembly (fig. 3–8)

a. Removal. Without removing engine fuel filter assembly, unscrew filter case from filter assembly and remove and discard filter element, packing and gasket.

b. Cleaning and Inspection.

(1) Wash parts with an approved cleaning solvent and dry thoroughly with filtered compressed air.

(2) Visually inspect filter case or corrosion, cracks, damaged threads or other obvious damage.

c. Installation. Dip replacement filter element in oil (Military Specification MIL–O–6081 grade 1005 or 1010) and install element and new packing and gasket in reverse order of removal procedure. Tighten filter case securely but do not overtorque.

3–19. Fuel Control Fuel Filter (fig. 3–8)

a. Removal. Without removing fuel control unit, unscrew filter cap and remove packing, filter spring, filter element, and packing.

b. Cleaning and Inspection.

(1) Wash parts with an approved cleaning solvent and dry thoroughly with filtered compressed air.

(2) Visually inspect filter spring for cracks, or other obvious damage. Inspect filter cap for cracks, corrosion, damaged threads, or other obvious damage. Replace all damaged parts.

c. Installation. Install replacement filter element and new packing in reverse order of removal procedure. Tighten filter cap securely but do not overtorque.

3–20. Filter Assembly (fig. 3–8)

a. Removal. Remove tube assemblies from filter assembly. Remove two attaching bolts, six washers, two nuts and remove filter assembly from power unit.

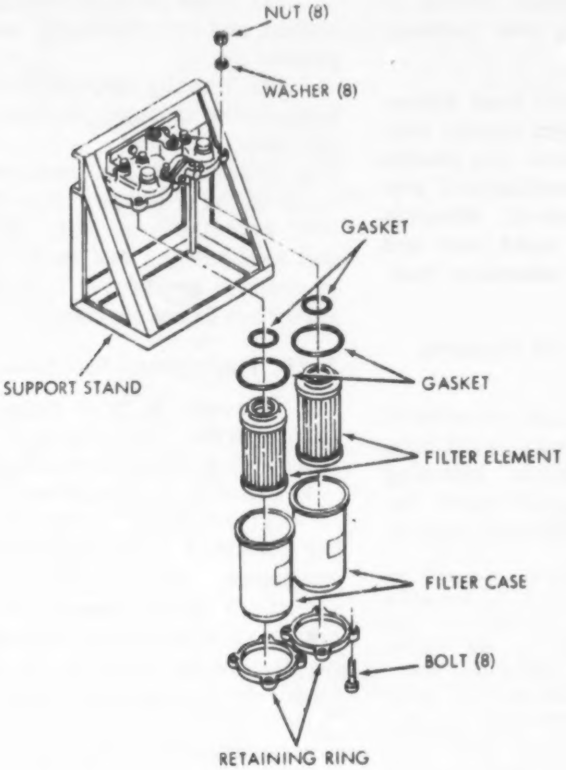
b. Installation. Install replacement filter assembly in reverse order of removal procedure. Tighten attaching bolts securely. Connect tube assemblies, using new packing.

3–21. Fuel Boost Pump (fig. 3–8)

a. Removal.

(1) Remove wiring harness connector, tube assembly and hose assembly from fuel boost pump.

(2) Remove four attaching bolts, eight washers and four nuts; remove fuel boost pump from power unit.



ME -5-6115-434-12/3-7

Figure 3-7. External fuel system filter elements replacement.

b. Installation.

(1) Install replacement fuel boost pump on power unit and secure with attaching washers and bolts.

(2) Connect tube assembly and hose assembly to pump using new packing. Connect wiring harness connector to pump.

3-22. Fuel Tank (fig. 3-8)

a. Removal.

(1) Remove plug from fuel tank and allow all fuel to drain from tank. Remove tube assemblies from fuel tank.

(2) Loosen clamps and slide from each end of fuel tank. Remove fuel tank from power unit.

b. Installation.

(1) Install replacement fuel in reverse order of removal procedure.

(2) Connect tube assemblies using new packing.

3-23. Fuel Solenoid Valve (fig. 3-8)

a. Removal.

(1) Without removing fuel control unit, remove wiring harness connector and tube assembly from solenoid valve.

(2) Remove nut and washer securing fitting to fuel control unit; remove solenoid valve, fitting, and washer.

(3) Remove fitting from solenoid valve.

b. Cleaning and Inspection.

(1) Wipe solenoid valve with cloth moistened in approved cleaning solvent and allow to dry.

(2) Inspect valve for cracks, breaks or other damage. Inspect electrical connector for bent pins, stripped threads, or other damage.

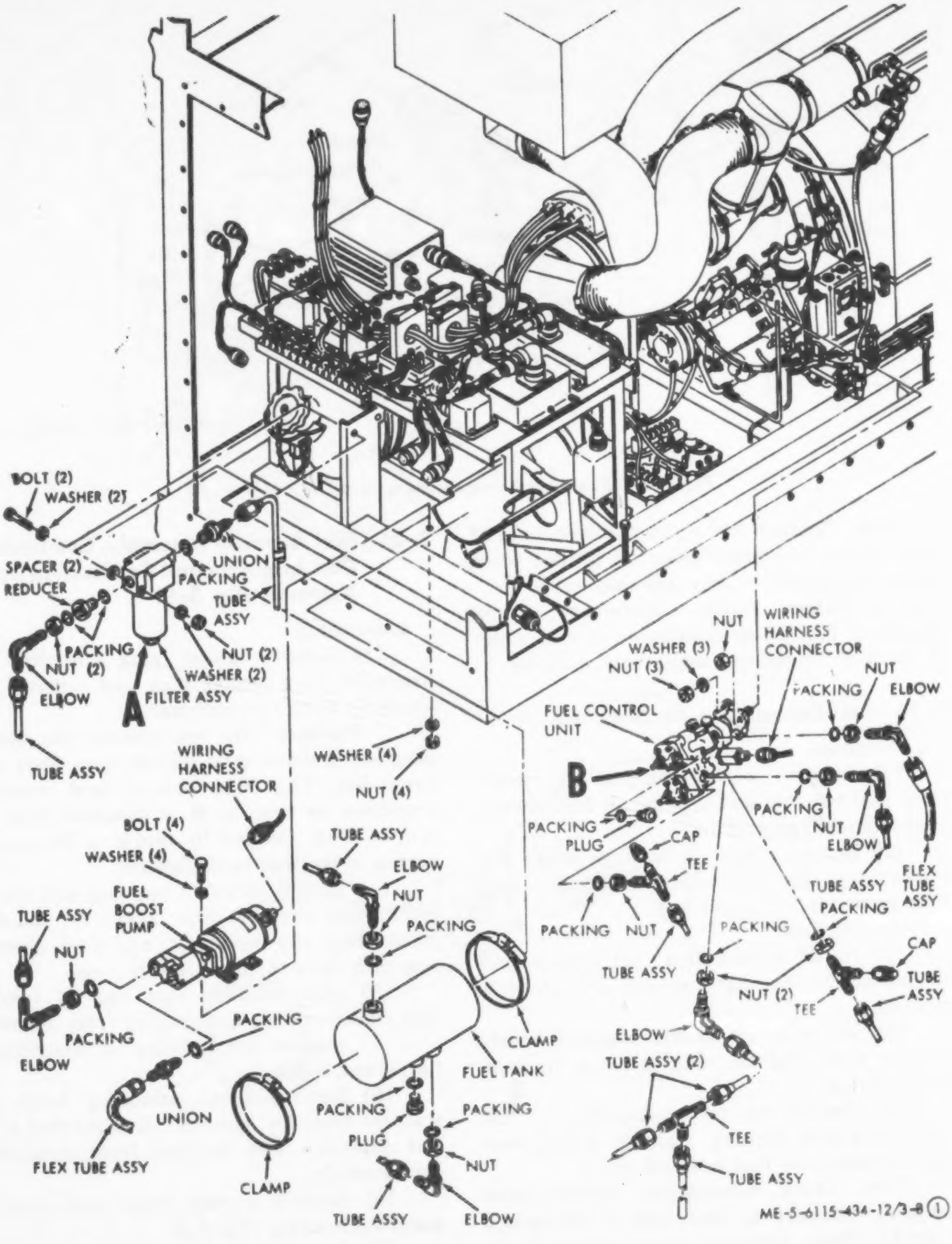

BOLT (2)
WASHER (2)
SPACER (2)
REDUCER
UNION
PACKING
TUBE ASSY
PACKING
NUT (2)
NUT (2)
WASHER (2)
ELBOW
A
FILTER ASSY
TUBE ASSY
NUT
WASHER (3)
NUT (3)
WIRING HARNESS CONNECTOR
NUT
PACKING
ELBOW
FUEL CONTROL UNIT
B
PACKING
NUT
ELBOW
PACKING
PLUG
CAP
TEE
PACKING
NUT
TUBE ASSY
TUBE ASSY
PACKING
FLEX TUBE ASSY
PACKING
CAP
TUBE ASSY
NUT (2)
TEE
ELBOW
TUBE ASSY (2)
TEE
TUBE ASSY
WASHER (4)
NUT (4)
WIRING HARNESS CONNECTOR
BOLT (4)
WASHER (4)
FUEL BOOST PUMP
TUBE ASSY
NUT
PACKING
ELBOW
TUBE ASSY
ELBOW
NUT
PACKING
CLAMP
PACKING
UNION
FLEX TUBE ASSY
CLAMP
FUEL TANK
CLAMP
PACKING
PLUG
PACKING
NUT
TUBE ASSY
ELBOW
ME-5-6115-434-12/3-8 ①

Figure 3-8. Fuel system components replacement (Sheet 1 of 2).

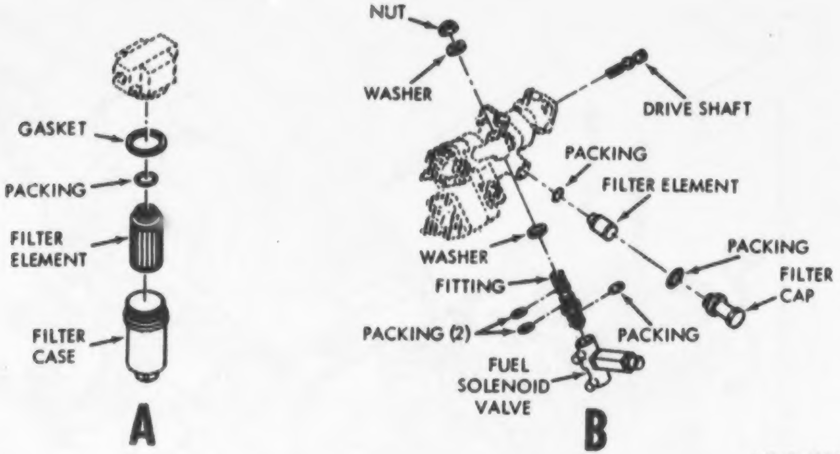


Figure 3–8. Fuel system components replacement (Sheet 2 of 2).

c. Test. Connect 24v dc to the terminals of solenoid coil. If solenoid does not actuate when power is applied, replace solenoid valve.

d. Installation. Install satisfactory or replacement fuel solenoid valve in reverse order of removal procedure, using new packing.

3–24. Fuel Control Unit (fig. 3–8)

a. Removal.

(1) Remove wiring harness connector from fuel solenoid and remove all tube assemblies from fuel control unit.

(2) Remove four attaching nuts and washers and carefully remove fuel control unit from engine in a straight line.

b. Installation.

(1) Install replacement fuel control unit on engine. Insure shaft splines are properly meshed.

(2) Secure in place with attaching washers and nuts. Tighten nuts to 50 to 70 inch-pound torque.

(3) Connect all tube assemblies to fuel unit using new packing. Connect wiring harness connector to fuel solenoid valve.

c. Test. Check acceleration limiter valve cracking pressure as described in paragraph 3–8*e*(3). Check governor speed setting as described in paragraph 3–8*e*(4).

3–25. Fuel Atomizer Assembly, Combustion Cap Assembly and Combustion Liner Assembly (fig. 3–9)

a. Removal.

(1) Remove igniter plug electrical lead assembly from igniter plug and remove tube assembly from fuel atomizer.

Warning: **Do not remove the igniter plug or ignition unit unless they have been grounded. The high-tension lead must be grounded as soon as it is removed from the igniter plug. Ground by touching the contact spring in the lead to the igniter.**

(2) Loosen screw in coupling and remove combustion chamber liner assembly, coupling, combustion cap assembly, and fuel atomizer assembly from turbine plenum.

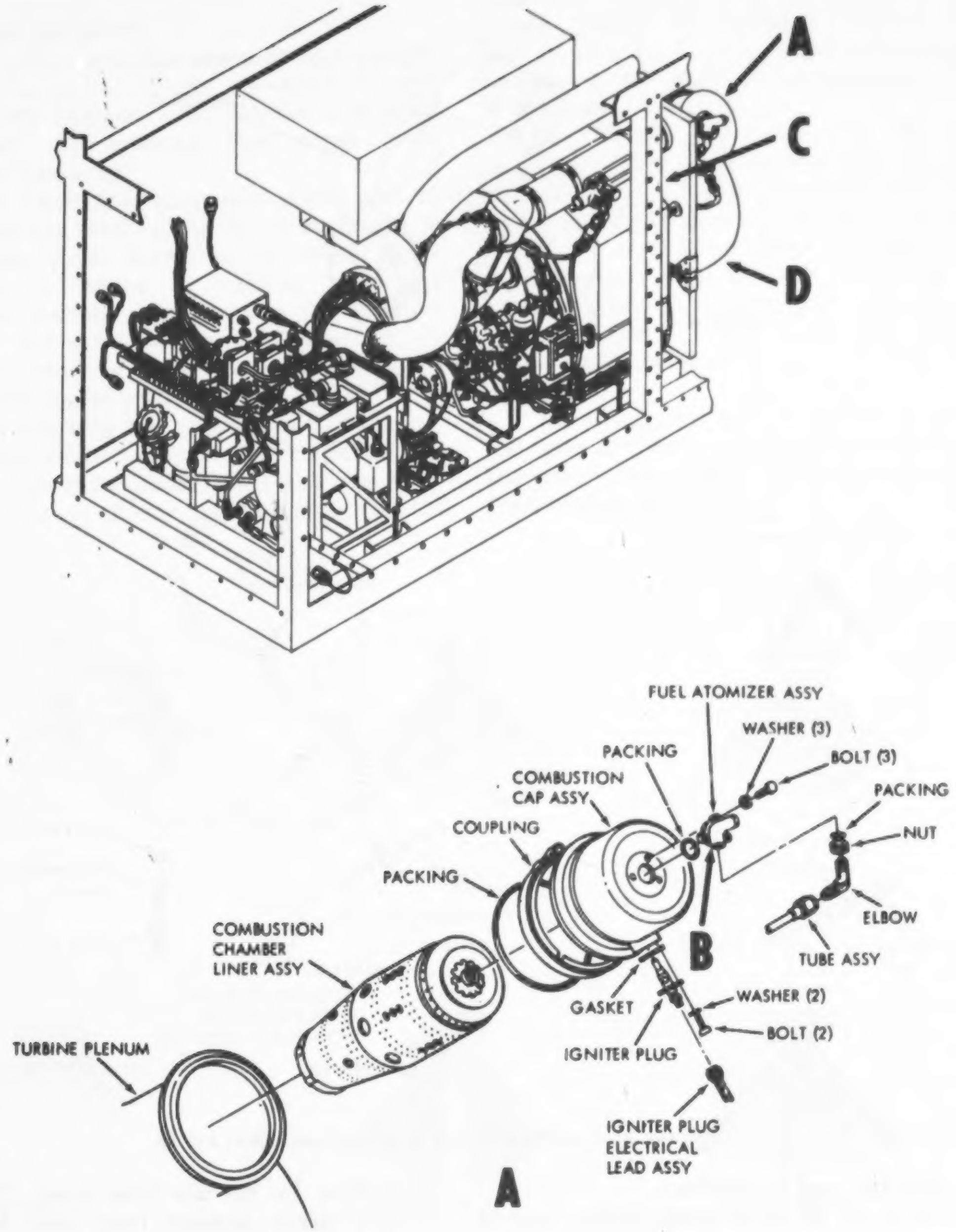
(3). Slide coupling over end of combustion chamber liner and remove from assembly.

(4) Remove igniter plug as described in paragraph 3–48*a*.

(5) Remove three attaching bolts and washers from fuel atomizer. Remove fuel atomizer assembly and packing from combustion cap assembly.

(6) Remove screen from fuel atomizer assembly housing (fig. 3–9).

(7) Remove liner assembly and packing from cap assembly.


A
C
D
FUEL ATOMIZER ASSY
WASHER (3)
PACKING
BOLT (3)
COMBUSTION CAP ASSY
PACKING
COUPLING
NUT
PACKING
ELBOW
COMBUSTION CHAMBER LINER ASSY
B
TUBE ASSY
WASHER (2)
GASKET
BOLT (2)
TURBINE PLENUM
IGNITER PLUG
IGNITER PLUG ELECTRICAL LEAD ASSY
A

ME-5-6115-434-12/3-9 ①

Figure 3-9. Fuel system components replacement (Sheet 1 of 2).

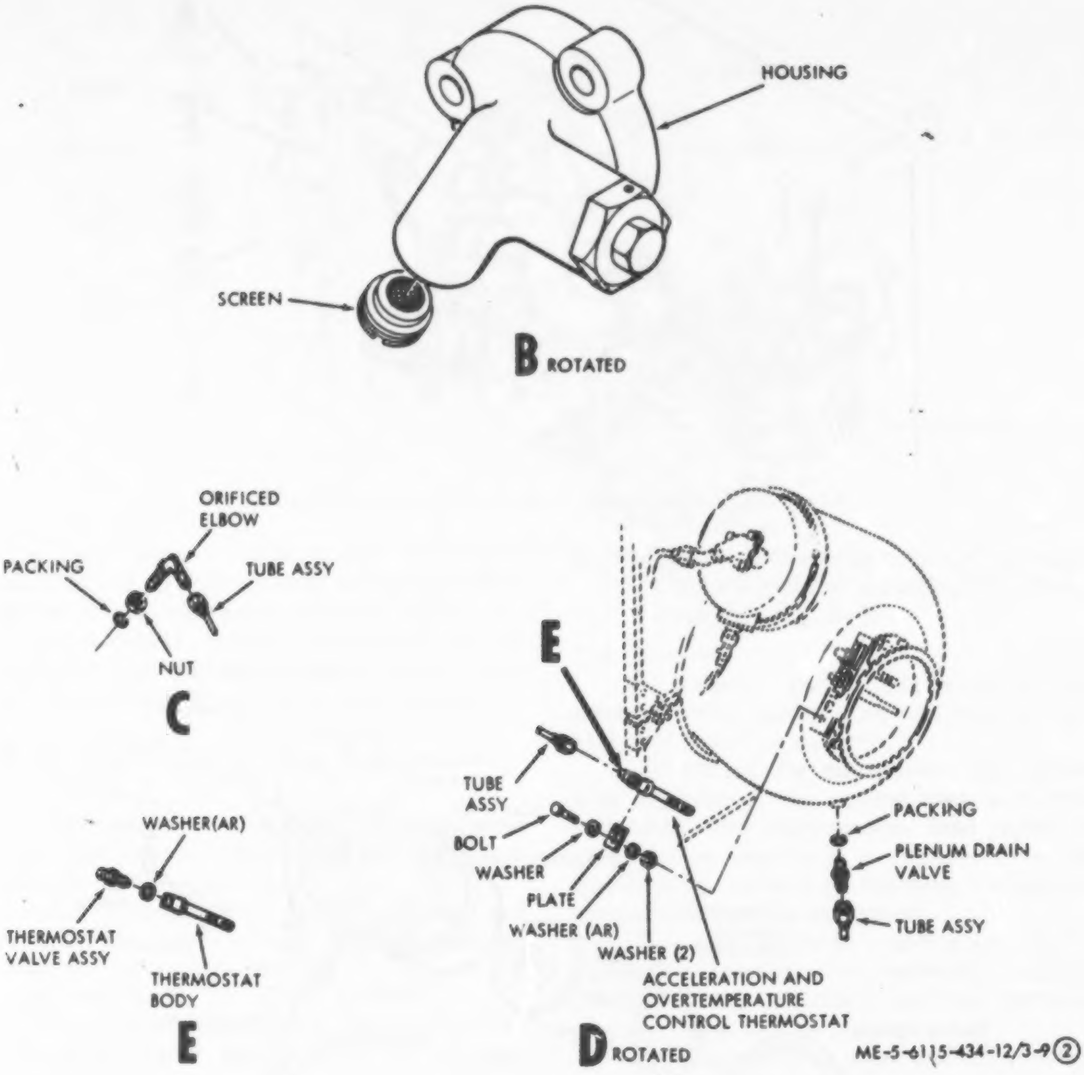

HOUSING
SCREEN
B ROTATED
ORIFICED ELBOW
PACKING
TUBE ASSY
NUT
C
WASHER(AR)
THERMOSTAT VALVE ASSY
THERMOSTAT BODY
E
E
TUBE ASSY
BOLT
WASHER
PLATE
WASHER (AR)
WASHER (2)
ACCELERATION AND OVERTEMPERATURE CONTROL THERMOSTAT
PACKING
PLENUM DRAIN VALVE
TUBE ASSY
D ROTATED
ME-5-6115-434-12/3-9 ②

Figure 3-9. Fuel system components replacement (Sheet 2 of 2).

b. Cleaning and Inspection.

(1) Wash all parts except igniter plug in approved cleaning solvent and dry thoroughly with filtered compressed air. If necessary, remove carbon deposits from atomizer nozzle using soft bristled fiber brush while directing filtered compressed air at approximately 20 psig pressure into atomizer assembly fuel inlet connection. Do not use wire brush. Clean excessive carbon deposits from liner assembly and cap assembly by scraping with a wooden scraper or equivalent.

(2) Inspect all metallic parts for cracks, corrosion, damaged threads, or other obvious damage. Inspect atomizer screen for clogging and breaks. Inspect liner assembly for cracks

and deformation in accordance with figure 3-11.

c. Test (fig. 3-10).

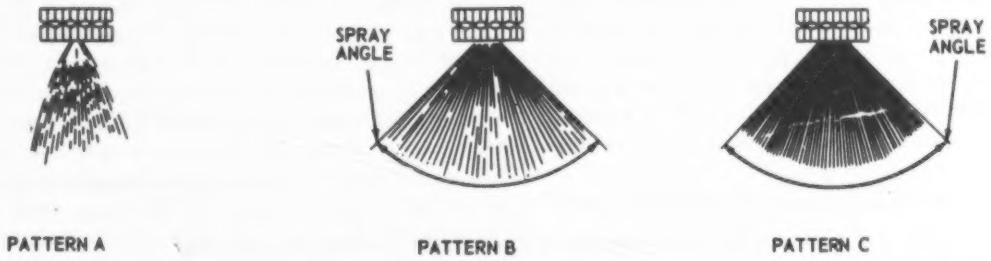
(1) Place atomizer assembly in a suitable holding device and connect a source of filtered fuel to the atomizer inlet. Provide a suitable container for catching fuel spray from atomizer discharge.

(2) Apply fuel at an inlet pressure of 10 ± 1 psig and observe that the spray pattern is approximately as shown on pattern A. There shall be no fizzing or bubbling back over atomizer assembly nut. (pattern D) No solid jets of fuel shall be permitted. (pattern F) No discontinuities in spray pattern shall be permitted. (pattern E)

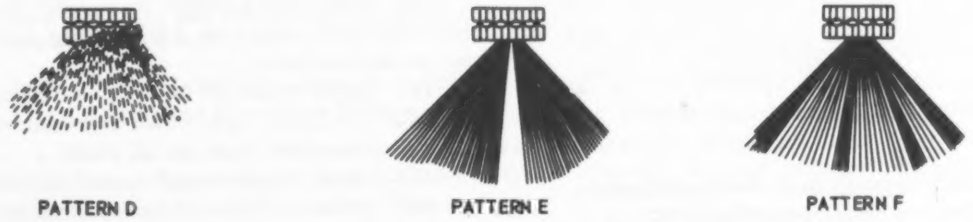
(3) Increase fuel pressure to 25 ± 1 psig inlet pressure and observe that the spray pattern is conical in shape, steady and even; approximately as shown in pattern B. No solid jets of fuel shall be permitted (pattern F) nor shall discontinuities in spray pattern be permitted (pattern E). Included angle of spray pattern, at a 6 ± 1 inch radius from atomizer assembly orifice shall be approximately 75 to 95 degrees.

(4) Increase fuel pressure to 200 ± 2 psig inlet pressure and observe that the spray pattern is conical in shape, steady and even; approximately as shown in pattern C. No solid jets of fuel shall be permitted (pattern F) nor shall discontinuities in spray pattern be permitted (pattern E). Included angle of spray pattern at a 6 ± 1 inch radius from atomizer assembly orifice shall be approximately 75 to 95 degrees.

(5) Upon completion of the spray pattern test, shut off fuel supply to atomizer assembly. Disconnect line to inlet and remove assembly from holding device.



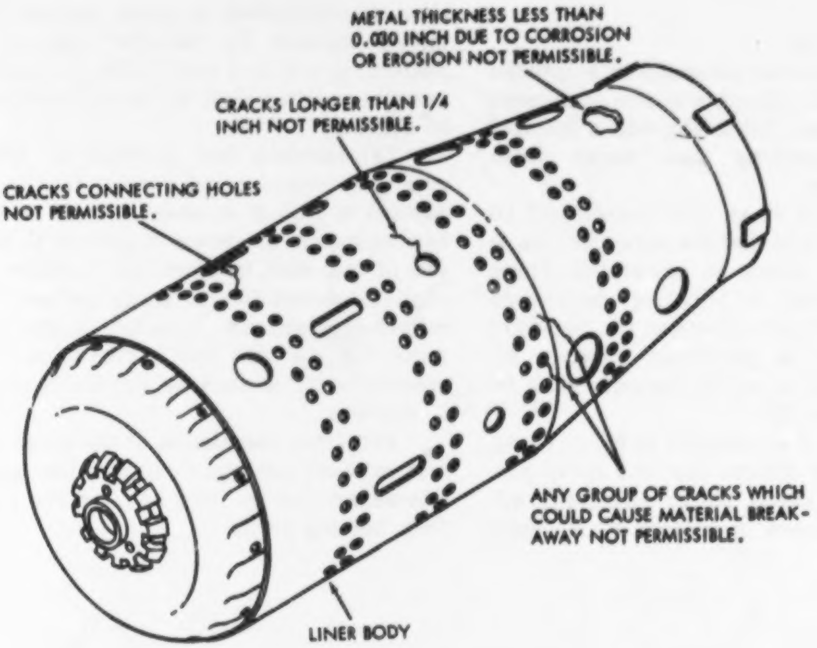
SATISFACTORY PATTERNS



UNSATISFACTORY PATTERNS

ME 6115-434-12/3-10

Figure 3-10. Fuel atomizer assembly spray test patterns.


METAL THICKNESS LESS THAN 0.030 INCH DUE TO CORROSION OR EROSION NOT PERMISSIBLE.
CRACKS LONGER THAN 1/4 INCH NOT PERMISSIBLE.
CRACKS CONNECTING HOLES NOT PERMISSIBLE.
ANY GROUP OF CRACKS WHICH COULD CAUSE MATERIAL BREAK-AWAY NOT PERMISSIBLE.
LINER BODY

ME-5-6115-434-12 /3-11

Figure 3-11. Inspection of combustion chamber liner assembly.

d. Installation.

(1) Install satisfactory or replacement parts in reverse order of removal procedure. Tighten fuel atomizer attaching bolts to 20 to 25 inch-pound torque. Install igniter plug as described in paragraph 3-48*d*.

(2) Connect tube assembly to fuel atomizer using new packing and connect igniter plug.

3-26. Acceleration and Overtemperature Control Thermostat (fig. 3-9)

a. Removal. Hold flats on thermostat valve assembly with a wrench and remove tube assembly from acceleration control thermostat. Remove attaching bolt, washer, plate, and washer; remove thermostat from engine.

b. Installation.

(1) Coat threads of attaching bolt with film of compound (Fel-Pro C-5).

(2) Install replacement thermostat in engine with side stamped AFT facing toward rear or downstream.

(3) Install washers (shims) as required for 0.010 to 0.020 inch pinch between plate and mounting boss, then install plate.

(4) Install washer and coated attaching bolt and tighten to 50 to 70 inch-pound torque.

(5) Hold flats on thermostat valve with a wrench and connect tube assembly. Tighten to 150 inch-pound torque.

(6) Check controlling temperature and adjust as required in accordance with paragraph 3-8*e*(1).

3-27. Plenum Drain Valve (fig. 3-9)

a. Removal. Remove tube assembly and remove plenum drain valve and packing from turbine plenum.

b. Installation. Install replacement drain valve in turbine plenum using new packing. Install valve with arrow pointing down. Connect tube assembly.

Section VIII. LUBRICATION SYSTEM

3-28. General

The lubrication system provides lubricating oil, under pressure, to cool and lubricate the gears and bearings in the engine. The lubricating oil is drawn from the oil tank by the oil pump assembly and directed under pressure through the oil filter element to the gears and bearings. A safety bypass valve is built into the body of the oil filter housing to provide a safety bypass for the oil in the event the filter element becomes clogged. An oil pressure sequencing switch is actuated by oil pressure to energize the ignition system and fuel solenoid valve when oil pressure is sufficient to adequately lubricate the gears and bearings during engine start. A low oil pressure switch is incorporated in the lubrication system to automatically shut down the engine if oil pressure drops below minimum requirements. A scavenge pump, an integral part of the oil pump assembly, returns the oil and entrained air from the engine through the oil temperature regulator to the oil tank assembly. A separate scavenge pump mounted on the dual pad gearbox returns oil from the dual pad gearbox. The entrained air is vented from the oil tank to the turbine exhaust.

Note. Access to lubrication system components is obtained by removing fuel and oil components access panel (fig. 1-1) and gas turbine engine power plant access panel (fig. 1-2).

3-29. Tube Assemblies, Hose Assemblies, Ducts and Plumbing Fittings

a. Removal. Remove tube assemblies, hose assemblies, clamps, ducts, and plumbing fittings as required for access to other components or to replace damaged parts.

Note. Tag or otherwise identify connection points, routing, orientation of fittings, and location of supporting clamps for aid at assembly.

b. Cleaning and Inspection.

(1) Clean tube assemblies, hose assemblies, clamps, and plumbing fittings with an approved cleaning solvent and dry thoroughly with filtered compressed air. Clean ducts with compressed air or a clean rag moistened with an approved cleaning solvent.

(2) Visually inspect tube assemblies for cracks, corrosion, abrasion, damaged threads, or other evidence of damage. Inspect ducts for tears, abrasions, and separation of laminations. Replace all damaged parts.

c. Installation. Install tube assemblies, hose assemblies, clamps, ducts and plumbing fittings in reverse order of removal procedures using new packings and gaskets as applicable.

***Caution:* Be sure tube and hose assemblies do not make direct physical contact with other surfaces of the power unit. Use clamps to support tube and hose assemblies and prevent contact. The high frequency vibration of the power unit may cause rapid wear and damage to the tube and hose assemblies leading to failure of the parts.**

3-30. Oil Filter Element (fig. 3-12)

a. Removal. Unscrew filter case from oil pump assembly without removing pump assembly from engine; remove packing and filter element.

b. Cleaning and Inspection.

(1) Clean filter case with an approved cleaning solvent and dry thoroughly with filtered compressed air.

(2) Visually inspect filter case for cracks, corrosion, damaged threads or other obvious damage. Replace damaged filter case.

c. Installation. Dip new replacement filter element in oil of the same specification and brand being used in engine lubrication system. Install small packing included with filter element in place, inside filter element neck. Install element in filter case using new packing. Install assembled filter case in oil pump assem-

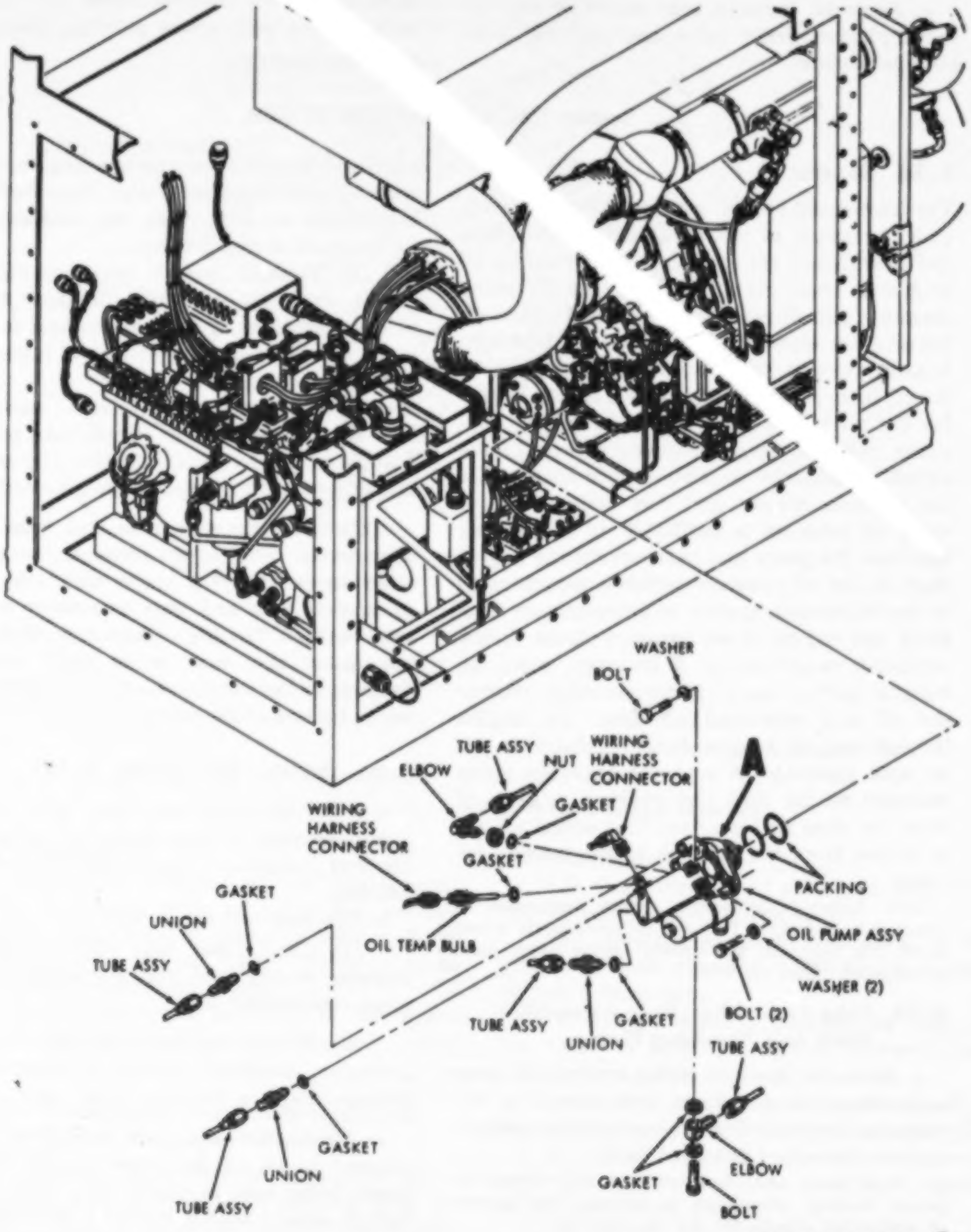

WASHER
BOLT
TUBE ASSY
NUT
WIRING HARNESS CONNECTOR
ELBOW
GASKET
A
WIRING HARNESS CONNECTOR
GASKET
PACKING
GASKET
UNION
OIL PUMP ASSY
TUBE ASSY
OIL TEMP BULB
WASHER (2)
TUBE ASSY
GASKET
UNION
BOLT (2)
TUBE ASSY
GASKET
UNION
ELBOW
GASKET
BOLT
TUBE ASSY
ME-5-6115-434-12/3-12 ①

Figure 3-12. Lubrication system component replacement (Sheet 1 of 2).

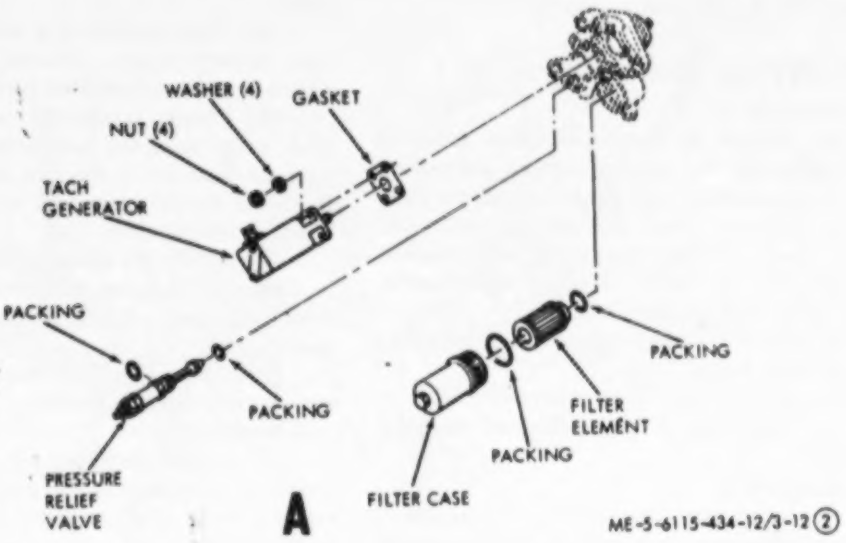


Figure 3-12. Lubrication system component replacement (Sheet 2 of 2).

bly. Tighten case securely, but do not overtorque case.

3–31. Pressure Relief Valve (fig. 3–12)

a. Removal. Unscrew pressure relief valve from oil pump assembly, without removing pump assembly from engine: remove valve assembly and packings.

b. Cleaning and Inspection.

(1) Clean pressure relief valve with an approved cleaning solvent and dry thoroughly with filtered compressed air.

(2) Visually inspect valve assembly for cracks, corrosion, abrasion, damaged threads, or other evidence of damage.

c. Installation. Install satisfactory or replacement pressure relief valve in oil pump assembly using new packing.

d. Adjustment. Check operation of valve assembly during engine operation. Oil pressure shall be 90 ± 10 psig. Adjust oil pressure by loosening locknut and turning adjustment screw as required. (para 3–8*b* for instructions for attaching gas turbine engine analyzer to power unit).

3–32. Tachometer Generator (fig. 3–12)

a. Removal. Without removing oil pump assembly from engine, detach wiring harness connection from tach-generator. Remove four attaching nuts and washers and carefully remove tach-generator from oil pump assembly. Remove gasket.

b. Installation. Install replacement tachometer generator on oil pump assembly using new gasket and secure with attaching washers and nuts. Tighten nuts securely. Reconnect wiring harness connector.

3–33. Oil Temperature Bulb (fig. 3–12)

a. Removal. Without removing oil pump assembly, remove wiring harness connector from oil temperature bulb. Unscrew and remove oil temperature bulb and gasket.

b. Cleaning and Inspection.

(1) Clean oil temperature bulb with an approved cleaning solvent and dry thoroughly with filtered compressed air.

(2) Visually inspect oil temperature bulb for cracks, corrosion, abrasion, damaged threads, or other evidence of damage.

c. Installation. Install satisfactory or replacement oil temperature bulb on oil pump assembly using new gasket. Tighten securely and reconnect wiring harness connector.

3-34. Oil Pump Assembly (fig. 3-12)

a. Removal.

(1) Remove all tube assemblies from oil pump assembly and wiring harness connectors from tach-generator and oil temperature bulb.

(2) Remove three attaching bolts and washers and carefully remove oil pump assembly and packing, with attached components, from engine in a straight line.

(3) Remove tach-generator as described in paragraph 3-32*a*.

b. Cleaning. Clean tach-generator with a clean rag moistened with an approved cleaning solvent.

c. Installation.

(1) Install tach-generator on replacement oil pump assembly as described in paragraph 3-32*b*.

(2) Install replacement oil pump assembly on engine using new packing.

Caution: **Install oil pump assembly in a straight line and use care to properly engage splines.**

(3) Secure oil pump assembly to engine mounting pad with attaching washers and bolts. Tighten bolts to 50 to 70 inch-pound torque.

(4) Reconnect tube assemblies to oil pump assembly using new gaskets. Reconnect wiring harness connectors to oil temperature bulb and tach-generator.

3-35. Low Oil Pressure Switch (fig. 3-13)

a. Removal. Remove tube assembly and wiring harness connector from low oil pressure switch. Remove two attaching bolts and washers and remove switch from engine.

b. Cleaning and Inspection.

(1) Clean switch with a clean rag moistened with an approved cleaning solvent.

(2) Visually inspect switch for cracks, damaged threads, or other evidence of damage.

c. Test.

(1) Check continuity across receptacle pins. Circuit across pins A and B should be closed; circuit across pins B and C should be open.

(2) Place switch in a suitable holding device. Slowly apply filtered, regulated compressed air to switch inlet port.

(3) Check continuity across receptacle pins while applying air pressure. Before 45 psig air pressure is reached, circuit across pins A and B should open and circuit across pins B and C should close.

(4) Slowly decrease air pressure. At 37 ± 3 psig air pressure, circuit across pins A and B should close; circuit across pins B and C should open.

(5) Disconnect air supply and remove switch from holding device.

d. Installation.

(1) Install satisfactory or replacement switch in place and secure with attaching washers and bolts. Tighten bolts to 20 to 25 inch-pound torque.

(2) Reconnect tube assembly and wiring harness connector to low oil pressure switch.

3-36. Oil Jet (fig. 3-13)

a. Removal. Disconnect tube assembly from oil jet. Unscrew and remove oil jet and gasket from gear box assembly.

b. Cleaning and Inspection.

(1) Clean oil jet with an approved cleaning solvent and thoroughly dry with filtered compressed air.

(2) Visually inspect oil jet for corrosion, cracks, abrasion, damaged threads, or other evidence of damage.

c. Installation. Install satisfactory or replacement oil jet in gear box assembly using new gasket. Tighten securely and connect tube assembly.

3-37. Oil Scavenge Pump Assembly (fig. 3-13)

a. Removal. Remove tube assemblies from scavenge pump assembly. Remove four attaching bolts and washers from pump assembly. Carefully remove pump assembly and packing from gear box assembly in a straight line.

b. Installation.

(1) Install replacement scavenge pump assembly and new packing on gear box assem-

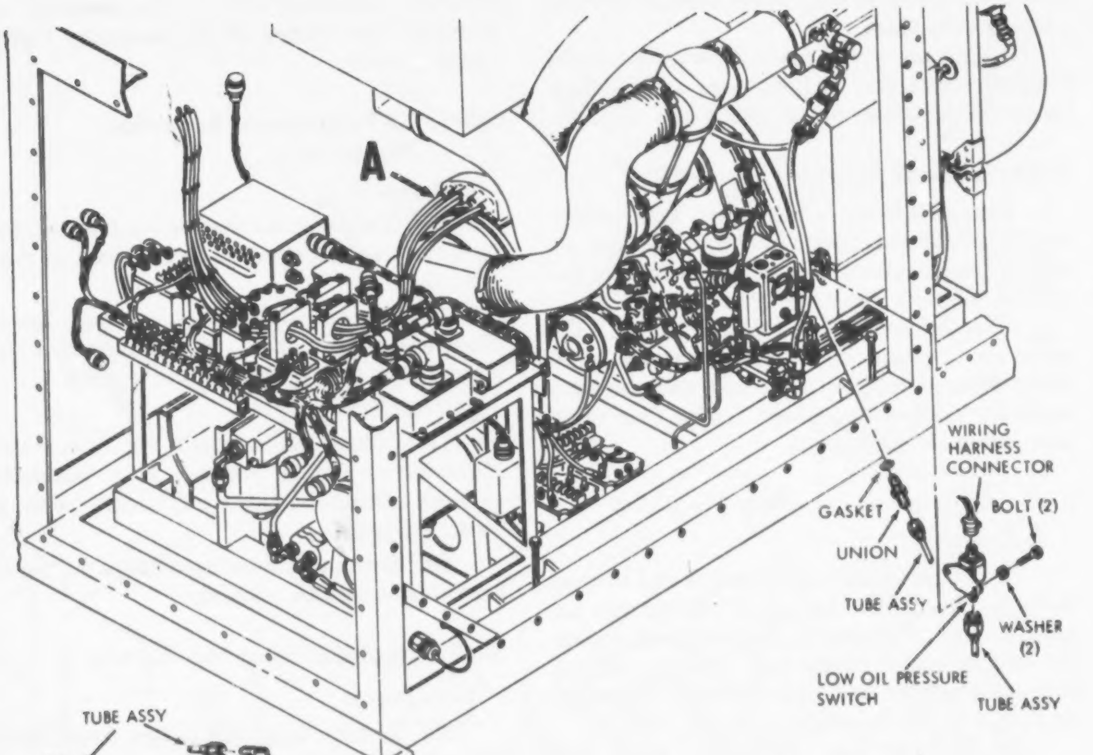

A
WIRING HARNESS CONNECTOR
GASKET
BOLT (2)
UNION
TUBE ASSY
WASHER (2)
LOW OIL PRESSURE SWITCH
TUBE ASSY
TUBE ASSY
ELBOW
NUT
GASKET
ELBOW
NUT
GASKET
TUBE ASSY
ELBOW
NUT
GASKET
TUBE ASSY
OIL TANK
GASKET
ELBOW
HOSE ASSY
BOLT
OIL JET
TUBE ASSY
GASKET
GASKET
OIL JET
TUBE ASSY
TUBE ASSY
UNION
GASKET
PACKING
WASHER (4)
BOLT (4)
OIL SCAVENGE PUMP ASSY
PACKING
BOLT
ELBOW
TUBE ASSY
TUBE ASSY
PACKING
ELBOW
BOLT
A ROTATED
ME-5-6115-434-12/3-13

Figure 3-13. Lubrication system component replacement.

bly. Insure that drive shaft is installed and meshed properly in gear box assembly and that packing is in place.

(2) Secure pump assembly with attaching washers and bolts. Tighten bolts securely and reconnect tube assemblies using new washers.

3-38. Oil Tank Assembly (fig. 3-13)

a. Removal. Drain all oil from tank assembly. Remove tube assemblies from oil tank assembly, loosen clamp strap on tank cradle, and remove oil tank assembly from cradle.

b. Installation. Install replacement oil tank assembly in place in cradle and secure with clamp strap. Reconnect tube assemblies to tank assembly using new gaskets. Insure that drain plug is securely tightened.

3-39. Cooling Fan Assembly (fig. 3-14)

a. Removal.

(1) Loosen clamp and remove end of hose assembly from inlet flange of cooling fan assembly. Loosen screws in duct support assembly at fan outlet flange and remove ends of support assembly and hose assembly from outlet flange of fan assembly.

(2) Remove four attaching bolts and special washers from fan assembly. Carefully remove cooling fan assembly from engine in a straight line.

b. Installation.

(1) Install replacement cooling fan assembly on engine using new packing.

(2) Secure fan assembly to engine mounting pad with attaching washers and bolts. Tighten bolts to 50 to 70 inch-pounds torque.

(3) Reconnect end of hose assembly and duct support assembly to outlet flange of fan assembly. Tighten screws in support assembly securely. Reconnect end of hose assembly and clamp to inlet flange of fan assembly. Tighten clamp securely.

3-40. Oil Temperature Regulator (fig. 3-14)

a. Removal.

(1) Remove hose assemblies from oil temperature regulator valve. Drain hoses of residual oil.

(2) Loosen attaching clamps and remove hose assemblies from oil temperature regulator. Remove regulator from engine.

b. Installation.

(1) Install replacement oil temperature regulator on cradle. Replace hose assemblies on each end of regulator and secure with attaching clamps.

(2) Reconnect hose assemblies to regulator valve using new packing.

3-41. Regulator Valve (fig. 3-14)

a. Removal.

(1) Remove hose assemblies from regulator valve. Drain hoses of residual oil.

(2) Remove four attaching bolts and washers and remove regulator valve, and two packings from oil temperature regulator.

b. Installation.

(1) Install new packings in place in oil temperature regulator. Install replacement regulator valve in place and secure with attaching washers and bolts. Tighten bolts securely.

(2) Reconnect hose assemblies to regulator valve using new packing.

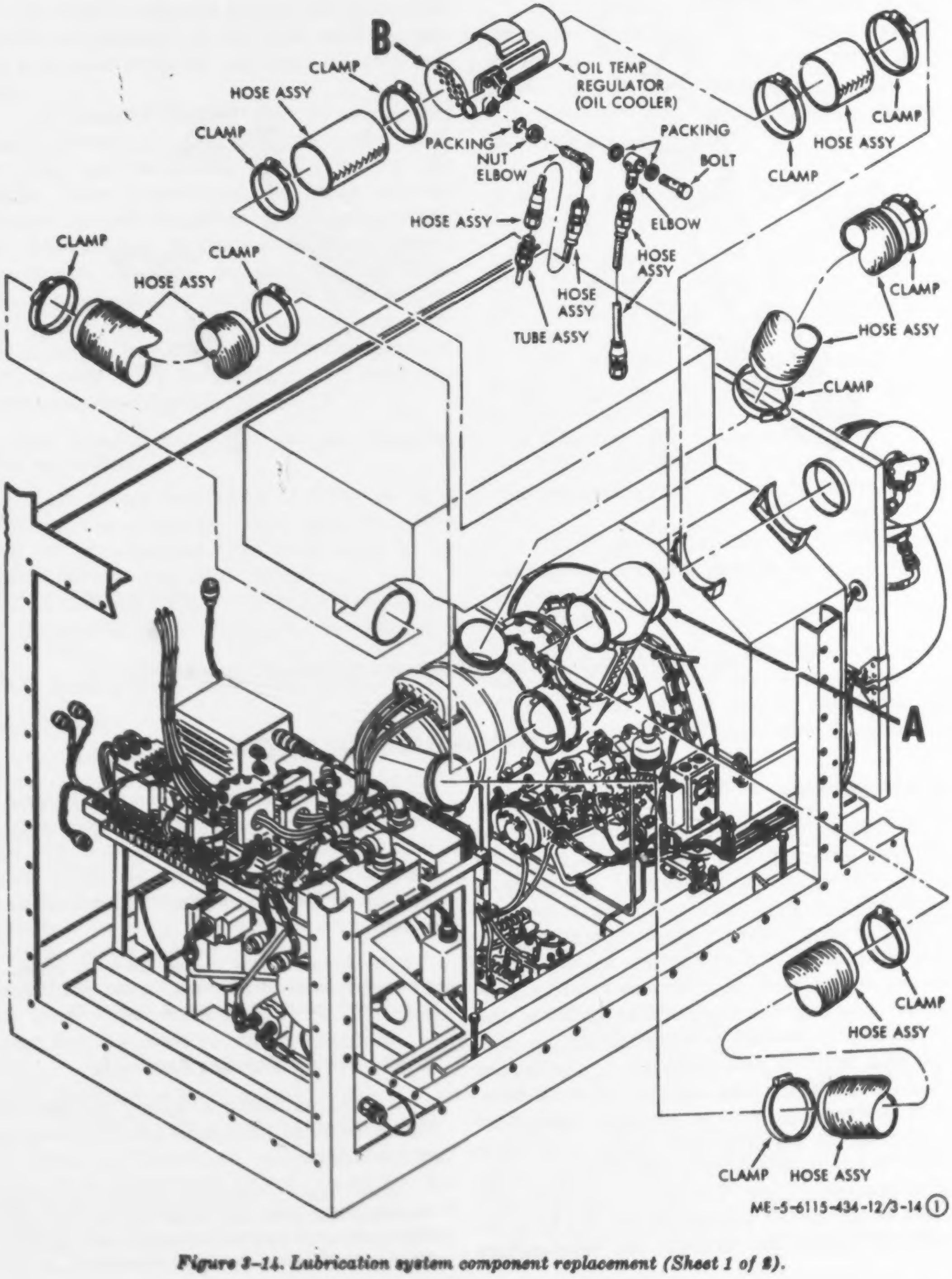
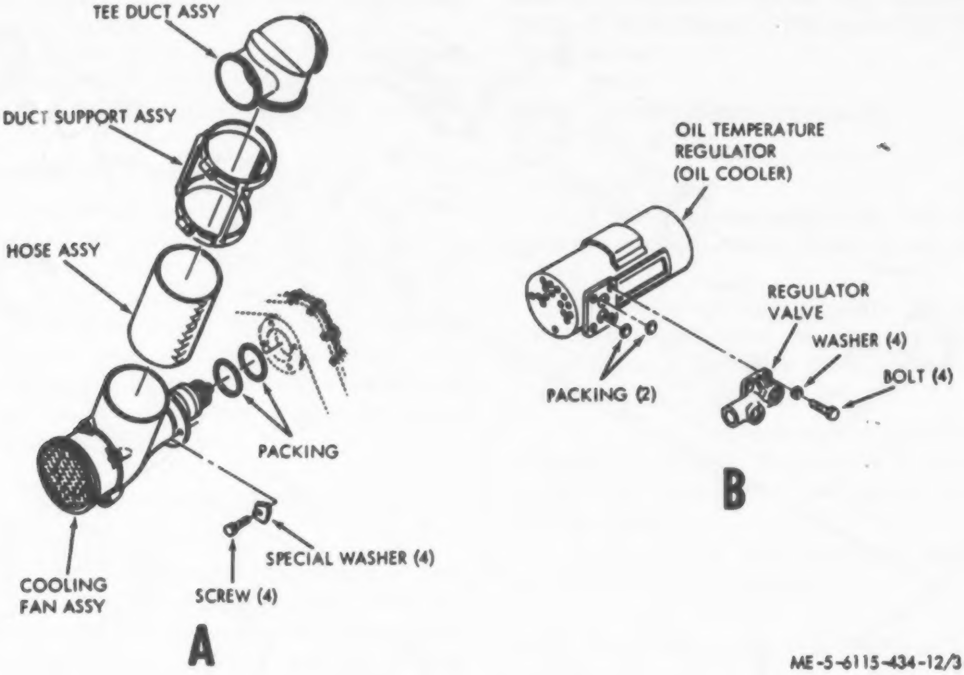

B
CLAMP
HOSE ASSY
CLAMP
OIL TEMP
REGULATOR
(OIL COOLER)
PACKING
NUT
ELBOW
PACKING
BOLT
ELBOW
CLAMP
HOSE ASSY
CLAMP
HOSE ASSY
HOSE ASSY
HOSE ASSY
TUBE ASSY
CLAMP
CLAMP
HOSE ASSY
CLAMP
HOSE ASSY
CLAMP
A
CLAMP
HOSE ASSY
CLAMP
HOSE ASSY
ME-5-6115-434-12/3-14 ①

Figure 3-14. Lubrication system component replacement (Sheet 1 of 2).



ME-5-6115-434-12/3-14 ②

Figure 3-14. Lubrication system component replacement (Sheet 2 of 2).

Section IX. ENGINE ELECTRICAL SYSTEM

3-42. General

The engine electrical system consists of an ignition unit, ignition lead assembly, igniter plug, starter motor assembly, oil pressure sequencing switch, time totalizing meter and circuit breaker, exhaust gas temperature thermocouple, and a wiring harness assembly. The starter motor assembly provides rotating power for starting the engine. The ignition unit provides high voltage power through the igniter plug ignition lead assembly to the igniter plug to ignite the fuel mixture. The oil pressure sequencing switch provides sequenced control of the starting cycle based on oil pressure. The time totalizing meter records the engine operating time. The circuit breaker provides short circuit protection for the time totalizing meter. The exhaust gas temperature thermocouple provides an electrical signal proportional to exhaust gas temperature for the exhaust gas temperature indicator. The wiring harness assembly provides electrical interconnection of the engine electrical system components.

Note. Access to the engine electrical system components is obtained by removing the gas turbine engine power plant access panel (fig. 1-2).

3-43. Wiring Harness Assembly

a. Removal. Remove wiring harness assembly as required for access to other components or for repair.

Note. Tag or otherwise identify all connectors, terminals, and electrical leads for aid at assembly. Note routing of harness assembly and location and orientation of clamps for aid at assembly.

b. Cleaning and Inspection.

(1) Clean wiring harness assembly with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(2) Visually inspect for burned, bent, loose, corroded, or otherwise damaged connector pins and terminals. Inspect wiring for breaks, loose connections, or other obvious damage. Inspect insulation for burns, chafing, and deterioration. Replace all damaged parts.

c. Repair. Replace damaged wires, terminals, connectors, and receptacles by unsoldering connections, installing replacement part and soldering in accordance with Specification MIL-S-6872 using Sn 60 solder that conforms to Federal Specification QQ-S-571.

Note. Refer to figure 1-18 for wire connection points and routing.

d. Test. Check continuity of wires using a multimeter or continuity light. Refer to figure 1-18 for wire routing. Continuity must be indicated through individual wires.

e. Installation. Install wiring harness assembly in reverse order of removal procedures.

3-44. Engine Electrical Starter (fig. 3-15)

a. Removal.

(1) Remove wiring harness leads from starter terminals. Remove four attaching nuts and washers, and carefully remove starter and packing in a straight line from engine.

b. Installation.

(1) Install replacement starter on engine using new packing. Use care to avoid damage to starter pawls and engine jaw.

(2) Secure starter with attaching washers and nuts. Tighten nuts securely. Reconnect wiring harness leads to starter terminals.

3-45. Centrifugal Multi-Speed Switch Assembly (fig. 3-15)

a. Removal. Disconnect wiring harness connector from centrifugal switch assembly. Remove four attaching nuts and washers and carefully remove switch assembly and packing from engine in a straight line.

b. Installation.

(1) Install replacement switch assembly on engine using new packing. Secure switch assembly to engine with attaching washers and nuts. Tighten nuts securely.

(2) Reconnect wiring harness connector to switch assembly.

3-46. Oil Pressure Sequencing Switch (fig. 3-15)

a. Removal.

(1) Remove wiring harness connector and tube assembly from oil pressure sequencing switch.

(2) Remove attaching nut and washer from clamp and remove oil pressure sequencing switch from engine.

b. Cleaning and Inspection.

(1) Clean switch by wiping with a clean rag moistened with an approved cleaning solvent.

(2) Visually inspect switch for cracks, corrosion, damaged threads, or other evidence of damage.

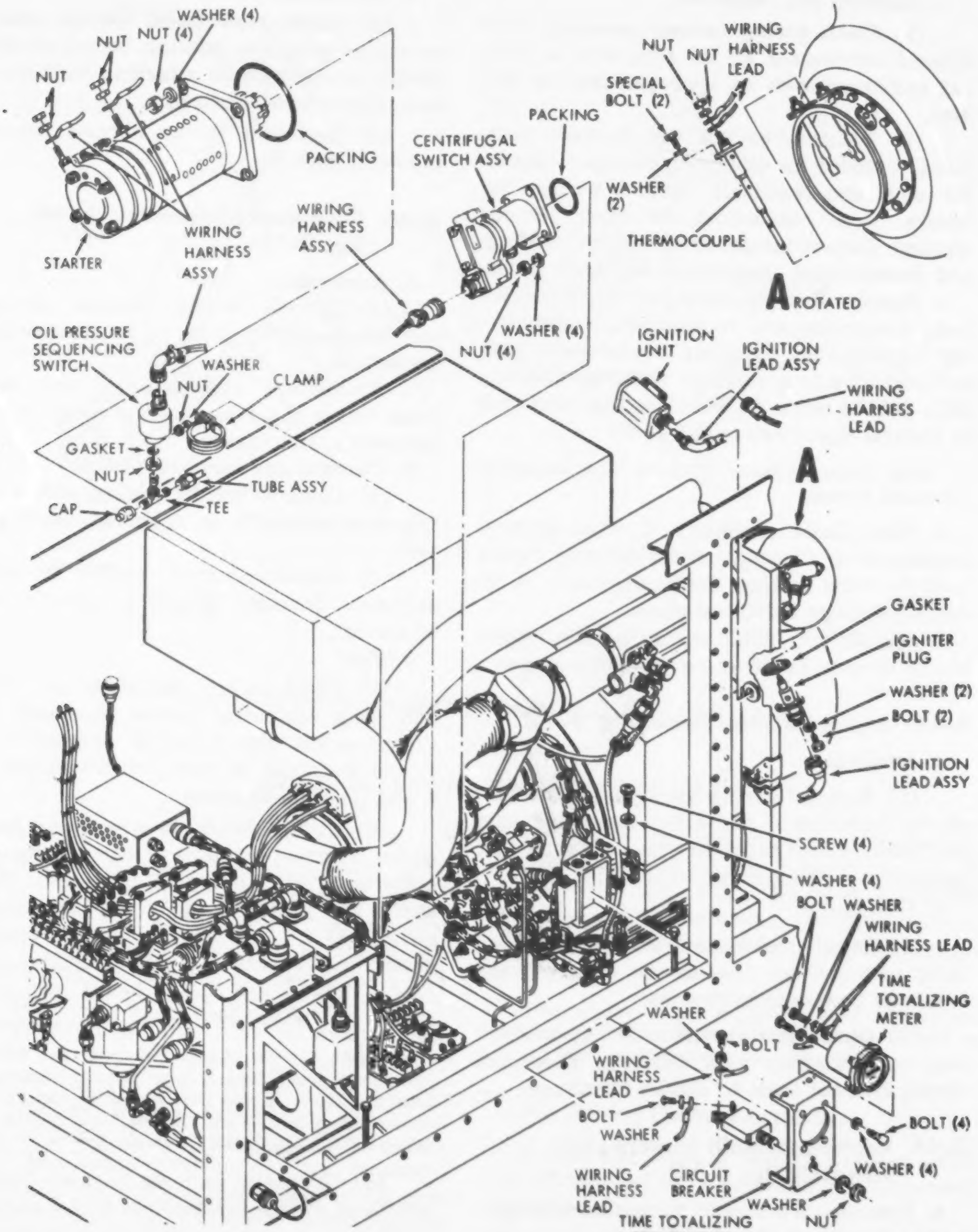
c. Test.

(1) Check switch actuation and closing and check continuity across receptacle pins. Circuit across pins A and B and across pins C and E should be open; circuit across pins C and D should be closed.

(2) Install switch in a suitable holding device. Connect a source of filtered, regulated compressed air to switch inlet port. Slowly apply air pressure and check actuation of switch. At 2.5 to 3.5 psig inlet air pressure, switch shall actuate to close circuits across pins A and B and across pins C and E and open circuit across pins C and D.

Note. Closing of circuit across pins A and B and across pins C and E need not be simultaneous providing circuit across pins A and B closes prior to circuit across pins C and E and both circuits close within 2.5 to 3.5 psig inlet air pressure.

(3) Gradually decrease inlet air pressure and check switch deactuation. At 1.5 psig minimum inlet pressure, switch shall deactuate to open circuits across pins A and B and across pins C and E and close circuits across pins C and D.


WASHER (4)
NUT
NUT (4)
NUT
PACKING
STARTER
WIRING HARNESS ASSY
WIRING HARNESS ASSY
CENTRIFUGAL SWITCH ASSY
PACKING
WASHER (4)
NUT (4)
OIL PRESSURE SEQUENCING SWITCH
WASHER
NUT
CLAMP
GASKET
NUT
TUBE ASSY
CAP
TEE
NUT
NUT
WIRING HARNESS LEAD
SPECIAL BOLT (2)
WASHER (2)
THERMOCOUPLE
A ROTATED
IGNITION UNIT
IGNITION LEAD ASSY
WIRING HARNESS LEAD
A
GASKET
IGNITER PLUG
WASHER (2)
BOLT (2)
IGNITION LEAD ASSY
SCREW (4)
WASHER (4)
BOLT
WASHER
WIRING HARNESS LEAD
TIME TOTALIZING METER
WASHER
BOLT
WIRING HARNESS LEAD
BOLT
WASHER
BOLT (4)
WASHER (4)
WIRING HARNESS LEAD
CIRCUIT BREAKER
WASHER
NUT
TIME TOTALIZING METER BRACKET

ME-5-6115-434-12/3-15

Figure 3-15. Engine electrical system component replacement.

d. Adjustment. Turn adjustment screw, located adjacent to electrical connector, as required, to bring switch actuation and deactuation points within specified values.

e. Installation.

(1) Install satisfactory or replacement oil pressure sequencing switch in place on engine. Secure clamp with attaching washer and nut. Tighten nut securely.

(2) Reconnect tube assembly using new gasket and reconnect wiring harness connector to oil pressure sequencing switch.

3-47. Ignition Unit (fig. 3-15)

a. Removal.

(1) Remove wiring harness connector and ignition lead assembly from ignition unit.

Warning: **Do not remove the igniter plug or ignition unit unless they have been grounded. The high-tension lead must be grounded as soon as it is removed from the igniter plug. Ground by touching the contact spring in the lead to the igniter.**

(2) Remove four attaching bolts and washers securing ignition unit to firewall and remove unit.

b. Cleaning and Inspection.

(1) Clean ignition unit by wiping with a clean rag moistened with an approved cleaning solvent.

(2) Visually inspect ignition unit for cracks, corrosion, damaged connector pins or other evidence of damage.

c. Test. Connect a satisfactory ignition lead assembly and a satisfactory igniter plug to ignition unit. Connect a 28v dc power source to ignition unit. Ignition unit must cause igniter plug to spark consistently at a rate of 10 sparks per second, maximum.

d. Installation.

(1) Install satisfactory or replacement ignition unit in place on firewall and secure with attaching washers and bolts. Tighten bolts securely.

(2) Reconnect ignition lead assembly and wiring harness connector to ignition unit.

3-48. Igniter Plug (fig. 3-15)

a. Removal.

(1) Remove ignition lead assembly from igniter plug.

Warning: **Do not remove the igniter plug or ignition unit unless they have been grounded. The high-tension lead must be grounded as soon as it is removed from the igniter plug. Ground by touching the contact spring in the lead to the igniter.**

(2) Remove two attaching bolts and washers and remove plug and gasket from engine combustion chamber.

b. Cleaning and Inspection.

(1) Clean igniter plug electrode by brushing with stiff bristle brush. Wipe exterior of plug with a clean rag moistened with an approved cleaning solvent.

(2) Visually inspect plug for cracks, damaged threads, excessive burning, or other evidence of damage. Check electrode for adequate protrusion.

c. Test. Connect a satisfactory ignition lead assembly and a satisfactory ignition unit to igniter plug. Connect a 28v dc power source. Plug must spark consistently at a rate of 10 sparks per second maximum.

d. Installation.

(1) Install satisfactory or replacement igniter plug in combustion chamber using new gasket.

(2) Coat threads of attaching bolts with a film of compound (Fel-Pro C-5). Secure plug with washers and coated bolts. Tighten bolts to 50 to 70 inch-pound torque.

(3) Reconnect ignition lead assembly to igniter plug.

3-49. Ignition Lead Assembly (fig. 3-15)

a. Removal. Remove ignition lead assembly from ignition unit and from igniter plug.

Warning: **Do not remove the igniter plug or ignition unit unless they have been grounded. The high-tension lead must be grounded as soon as it is removed from the igniter plug. Ground by touching the contact spring in the lead to the igniter.**

b. Cleaning and Inspection.

(1) Clean ignition lead assembly with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(2) Visually inspect for burned, bent, loose, corroded, or otherwise damaged connectors. Inspect insulation for burns, chafing, breaks, deterioration, or other obvious damage.

c. Test. Connect ignition lead assembly to a satisfactory ignition unit and a satisfactory igniter plug. Connect a 28v dc power source. Lead assembly must transmit voltage from ignition unit to igniter plug, causing igniter plug to spark consistently at a rate of 10 sparks per second maximum.

d. Installation. Reconnect satisfactory or replacement ignition lead assembly to ignition unit and to igniter plug.

3-50. Time Totalizing Meter (fig. 3-15)

a. Removal

(1) Remove four attaching screws and washers from engine bracket and remove time totalizing meter bracket from engine.

(2) Remove wiring harness leads; remove four attaching bolts and washers, and remove time totalizing meter from bracket.

b. Installation.

(1) Install replacement time totalizing meter on time totalizing meter bracket and secure with attaching washers and bolts. Tighten bolts securely.

(2) Reconnect wiring harness leads.

(3) Install time totalizing meter bracket in engine bracket and secure with attaching washers and screws. Tighten screws securely.

3-51. Circuit Breaker (fig. 3-15)

a. Removal.

(1) Remove four attaching screws and washers from engine bracket and remove time totalizing meter bracket from engine.

(2) Remove wiring harness leads from circuit breaker.

(3) Remove attaching nut and washer from bracket and remove circuit breaker.

b. Installation.

(1) Install replacement circuit breaker in time totalizing meter bracket. Secure with attaching washer and nut.

(2) Connect wiring harness leads to circuit breaker.

(3) Install time totalizing meter bracket in engine bracket and secure with attaching washers and screws. Tighten screws securely.

3-52. Exhaust Gas Thermocouple (fig. 3-15)

a. Removal.

(1) Remove wiring harness leads from thermocouple.

(2) Remove two special attaching bolts and washers and remove thermocouple from engine exhaust flange.

b. Installation.

(1) Coat threads of special attaching bolts with thin film of compound (Fel-Pro C-5).

(2) Install replacement thermocouple in engine exhaust flange.

(3) Secure thermocouple with washers and coated special attaching bolts. Tighten bolts to 50 to 75 inch-pound torque.

(4) Reconnect wiring harness leads to thermocouple.

Note. Insure chromel lead is matched to CR marking and alumel lead is matched to AL marking.

Section X. INSTRUMENT AND CONTROLS PANEL ASSEMBLIES

3-53. General

The instrument and controls panel assemblies consist of the instrument panel, conditioned air system circuit breaker panel, and environment control panel. The panels provide instruments and controls for operation and for monitoring operation of the various power unit functions. Wiring harness assemblies provide interconnection between the instruments and controls and the operating components.

3-54. Wiring Harness Assemblies

a. Removal. Remove wiring harness assemblies as required for access to other components or for repair.

Note. Tag or otherwise identify all connectors, terminals, and electrical leads for aid at assembly. Note routing of harness assemblies and location and orientation of clamps for aid at assembly.

b. Cleaning and inspection.

(1) Clean wiring harness assemblies with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(2) Visually inspect for burned, bent loose, corroded, or otherwise damaged connector pins and terminals. Inspect wiring for breaks, loose connections, or otherwise obvious damage. Inspect insulation for burns, chafing, and deterioration. Replace all damaged parts.

c. Repair. Replace damaged wires, terminals, connectors, and receptacles by unsoldering connections, installing replacement part and soldering in accordance with Military Specification MIL-S-6872 using Sn 60 solder that conforms to Federal Specification QQ-S-571.

Note. Refer to figures 1-17 through 1-20 for wire connection points and routing.

d. Test. Check continuity of wires and connections using a multimeter or continuity light. Continuity shall be indicated through individual wires and connections.

e. Installation. Install wiring harness assemblies in reverse order of removal procedures.

3-55. Instrument Panel Assembly (fig. 3-16)

Warning: **Electrical power shall be shut off prior to maintenance on electrical components.**

Note. Access to the component parts of the instrument panel is obtained by removing sixteen bolts and sixteen washers from the perimeter of the panel. Extend the upper part of panel outward with the lower part of panel resting on the lower recessed edge of the panel frame without a strain on the wiring harness.

a. Panel Meter (M2, M3, M4, M5, M6, M7, M8).

(1) *Removal.* Tag and disconnect electrical connections to meter. Remove three nuts, six washers, and three screws from meter. Remove meter and gasket from panel.

(2) *Cleaning and inspection.*

(*a*) Clean meter with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect meter for corrosion, cracked case, cracked glass, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

b. Exhaust Gas Temperature Indicator (M9).

(1) *Removal.* Tag and disconnect electrical connections and resistor assembly to indicator. Remove four screws and four washers from meter. Remove meter and gasket from panel.

(2) *Cleaning and inspection.*

(*a*) Clean indicator with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect indicator for corrosion, cracked case, cracked glass, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

c. Lamp Assembly (DS1, DS2, DS3, DS4, DS5, DS7, DS8, DS12, DS13, DS14, DS15, DS16, DS19, DS23).

(1) *Removal.* Tag and disconnect electrical connections to lamp assembly. Remove nut and washer attaching lamp assembly to panel. Remove lamp assembly from panel.

(2) *Cleaning and inspection.*

(*a*) Clean lamp assembly with filtered compressed air and electricians brush or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect lamp assembly for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

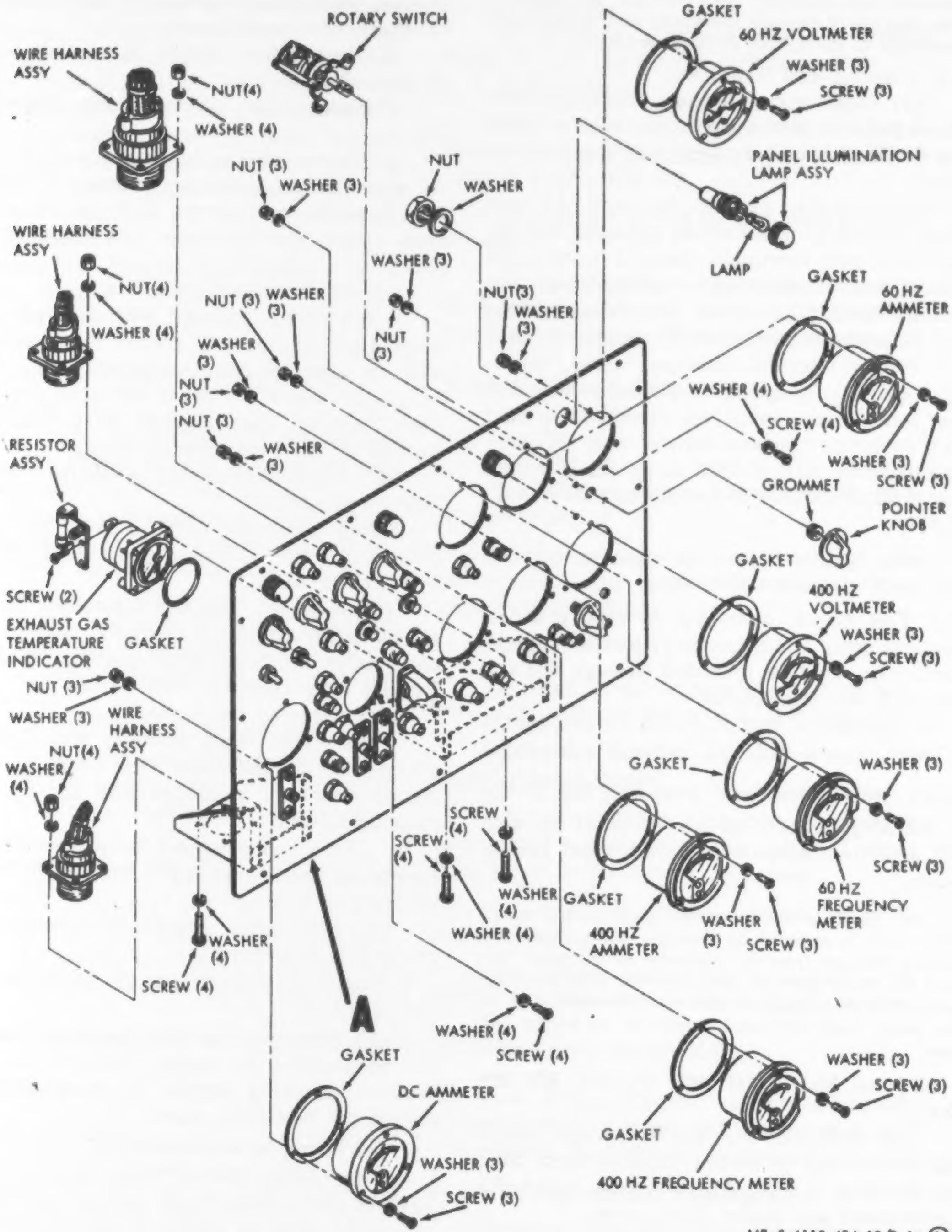
d. Toggle Switch (S1, S2, S3, S6, S7, S8, S9, S29, S30).

(1) *Removal.* Tag and disconnect electrical connections to switch. Remove nut and washer attaching switch to panel. Remove switch and boot from panel.

(2) *Cleaning and inspection.*

(*a*) Clean switch with filtered compressed air or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect switch for corrosion, cracks, damaged threads or other evidence of damage.


ROTARY SWITCH
WIRE HARNESS ASSY
NUT(4)
WASHER (4)
NUT (3)
WASHER (3)
NUT
WASHER
GASKET
60 HZ VOLTMETER
WASHER (3)
SCREW (3)
PANEL ILLUMINATION LAMP ASSY
LAMP
WIRE HARNESS ASSY
NUT(4)
WASHER (4)
WASHER (3)
NUT (3)
NUT (3)
WASHER (3)
NUT(3)
WASHER (3)
WASHER (3)
NUT (3)
NUT (3)
WASHER (3)
GASKET
60 HZ AMMETER
WASHER (4)
SCREW (4)
WASHER (3)
SCREW (3)
RESISTOR ASSY
GROMMET
POINTER KNOB
SCREW (2)
EXHAUST GAS TEMPERATURE INDICATOR
GASKET
GASKET
400 HZ VOLTMETER
WASHER (3)
SCREW (3)
NUT (3)
WASHER (3)
WIRE HARNESS ASSY
NUT(4)
WASHER (4)
GASKET
WASHER (3)
SCREW (4)
SCREW (4)
WASHER (4)
WASHER (4)
GASKET
400 HZ AMMETER
WASHER (3)
SCREW (3)
SCREW (3)
60 HZ FREQUENCY METER
WASHER (4)
SCREW (4)
A
WASHER (4)
SCREW (4)
GASKET
DC AMMETER
WASHER (3)
SCREW (3)
WASHER (3)
SCREW (3)
GASKET
400 HZ FREQUENCY METER

ME-5-6115-434-12/3-16 ①

Figure 3-16. Instrument panel assembly component replacement (Sheet 1 of 4).

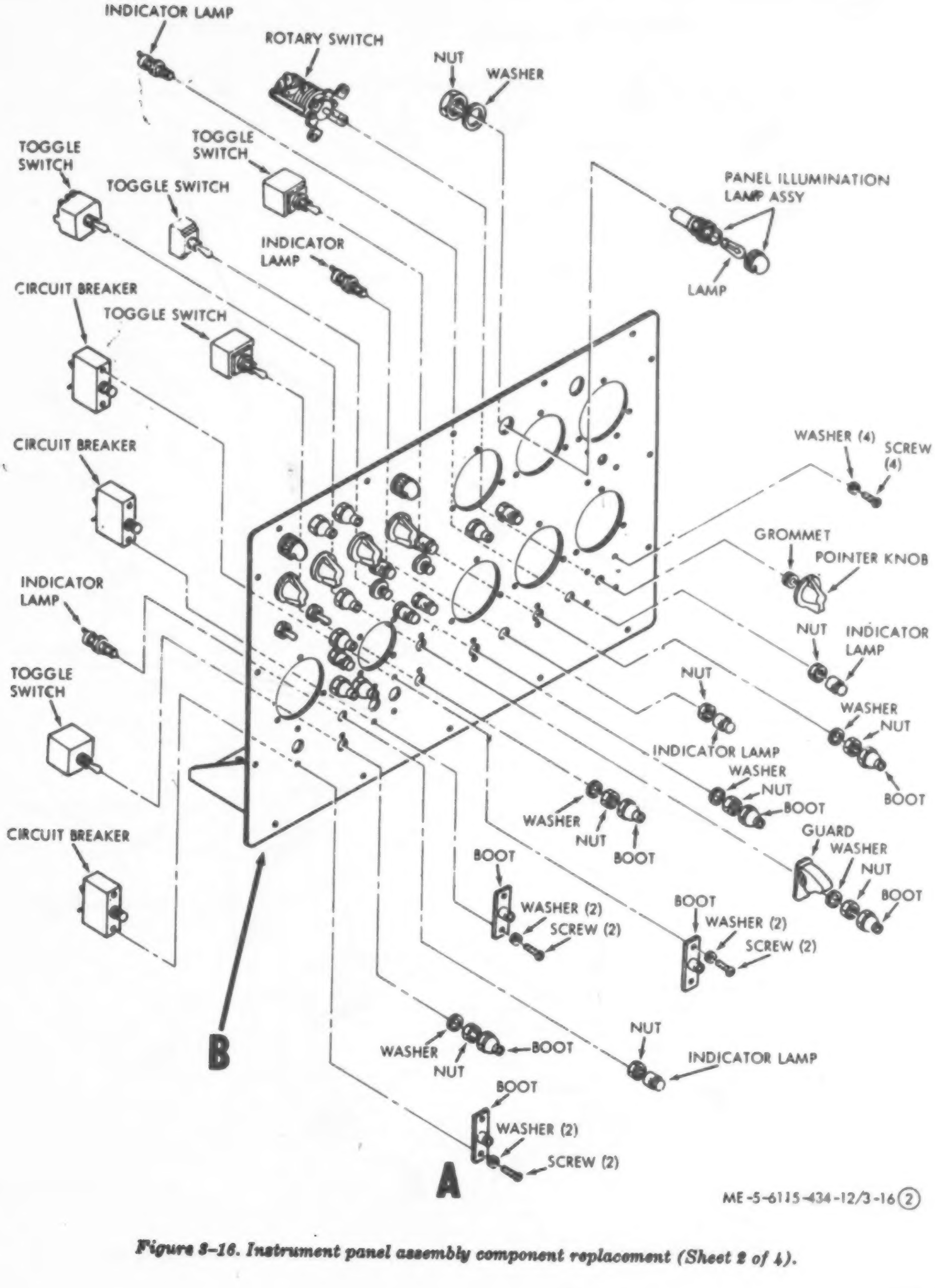

INDICATOR LAMP
ROTARY SWITCH
NUT
WASHER
TOGGLE SWITCH
TOGGLE SWITCH
TOGGLE SWITCH
PANEL ILLUMINATION LAMP ASSY
INDICATOR LAMP
LAMP
CIRCUIT BREAKER
TOGGLE SWITCH
CIRCUIT BREAKER
WASHER (4)
SCREW (4)
GROMMET
POINTER KNOB
INDICATOR LAMP
NUT
INDICATOR LAMP
TOGGLE SWITCH
NUT
WASHER
NUT
BOOT
INDICATOR LAMP
WASHER
NUT
BOOT
WASHER
NUT
BOOT
GUARD
WASHER
NUT
BOOT
CIRCUIT BREAKER
BOOT
WASHER (2)
SCREW (2)
BOOT
WASHER (2)
SCREW (2)
B
WASHER
NUT
BOOT
NUT
INDICATOR LAMP
BOOT
WASHER (2)
SCREW (2)
A
ME-5-6115-434-12/3-16②

Figure 3-16. Instrument panel assembly component replacement (Sheet 2 of 4).

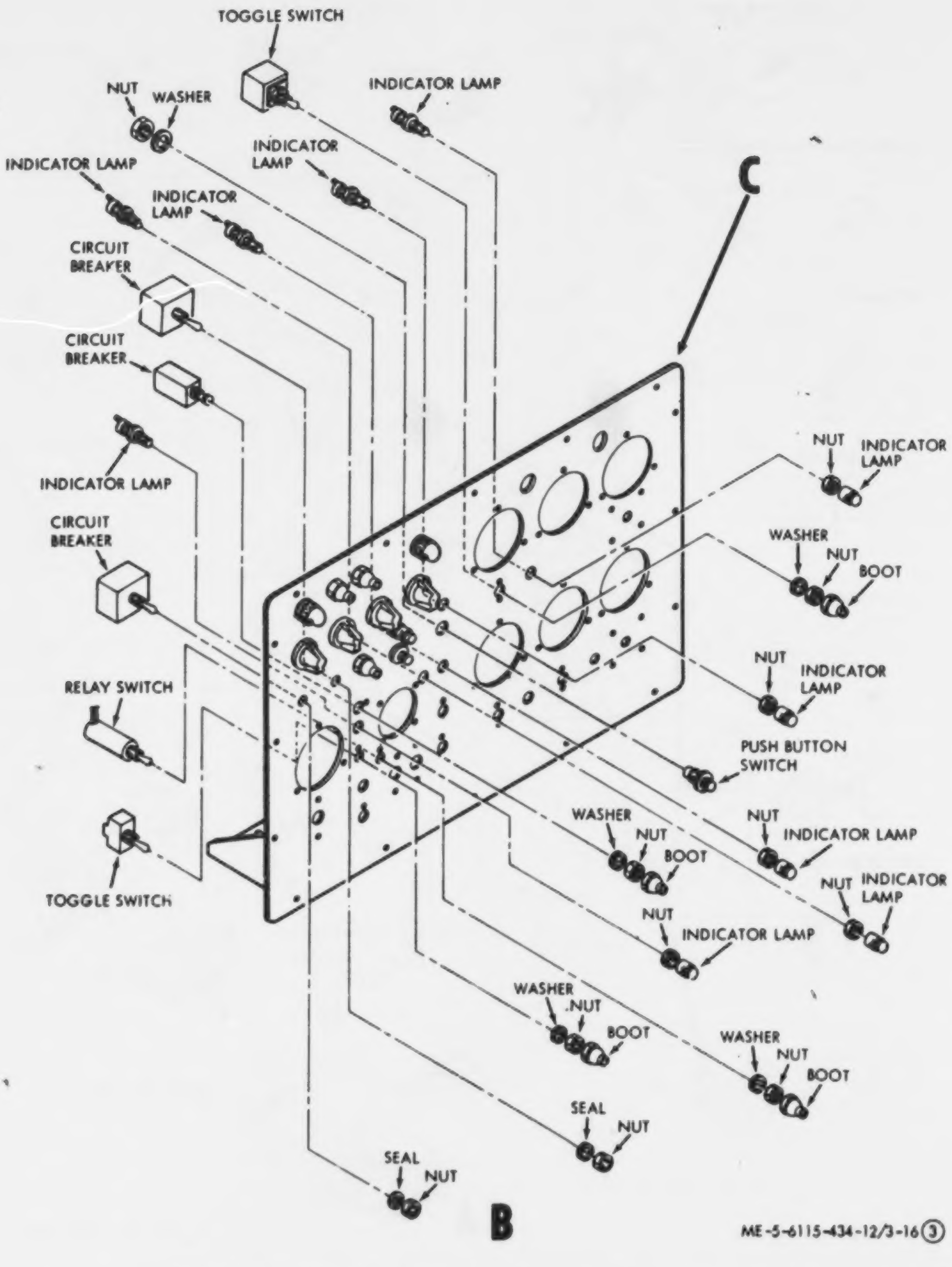

TOGGLE SWITCH
NUT
WASHER
INDICATOR LAMP
INDICATOR LAMP
INDICATOR LAMP
INDICATOR LAMP
C
CIRCUIT BREAKER
CIRCUIT BREAKER
INDICATOR LAMP
CIRCUIT BREAKER
NUT
INDICATOR LAMP
WASHER
NUT
BOOT
NUT
INDICATOR LAMP
RELAY SWITCH
PUSH BUTTON SWITCH
WASHER
NUT
BOOT
NUT
INDICATOR LAMP
TOGGLE SWITCH
NUT
INDICATOR LAMP
NUT
INDICATOR LAMP
WASHER
NUT
BOOT
WASHER
NUT
BOOT
SEAL
NUT
SEAL
NUT
B
ME-5-6115-434-12/3-16③

Figure 3-16. Instrument panel assembly component replacement (Sheet 3 of 4).

Reproduced from poor document.

best copy available

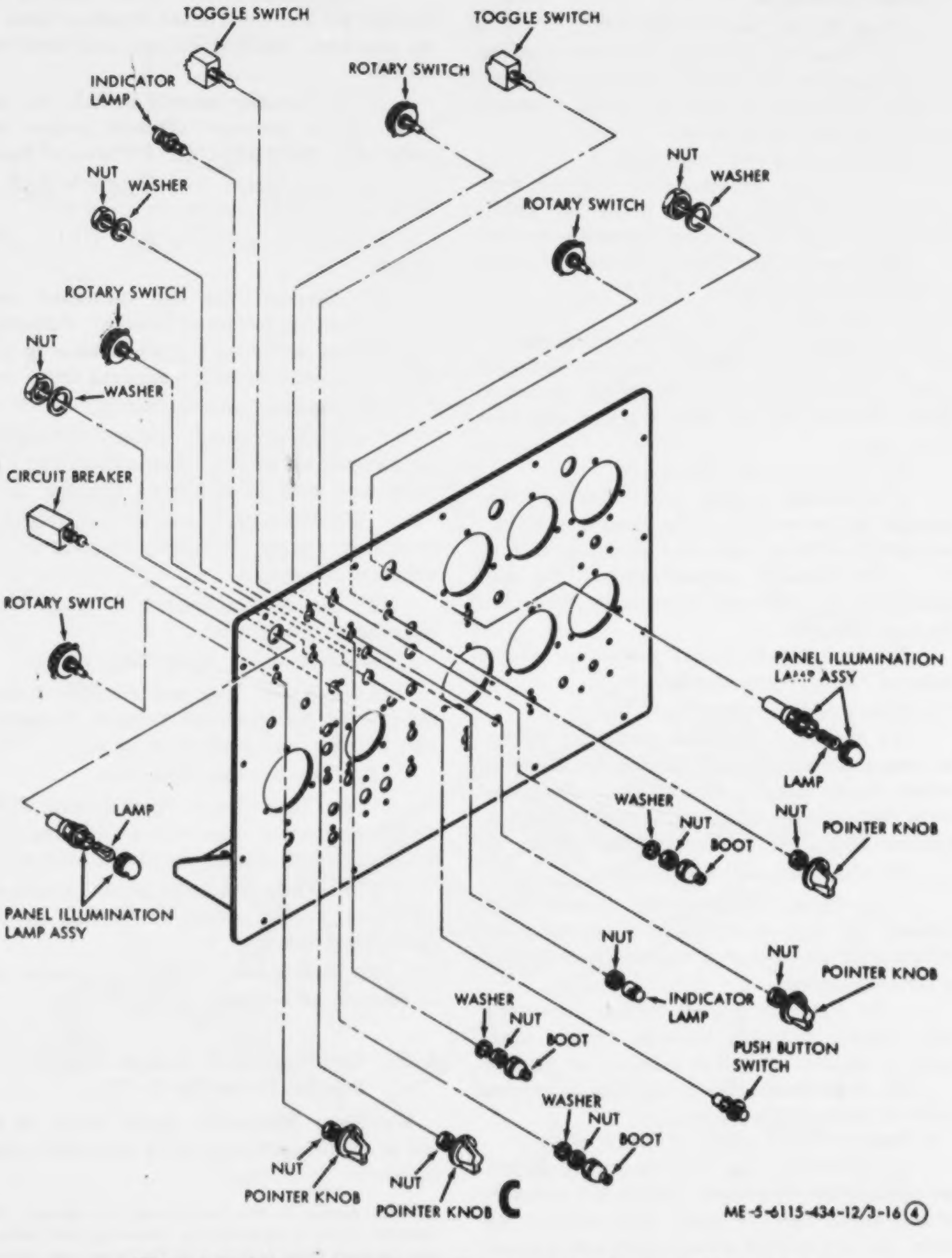

TOGGLE SWITCH
TOGGLE SWITCH
ROTARY SWITCH
INDICATOR LAMP
NUT
WASHER
NUT
WASHER
ROTARY SWITCH
ROTARY SWITCH
NUT
WASHER
CIRCUIT BREAKER
ROTARY SWITCH
PANEL ILLUMINATION LAMP ASSY
LAMP
WASHER
NUT
BOOT
NUT
POINTER KNOB
LAMP
PANEL ILLUMINATION LAMP ASSY
NUT
INDICATOR LAMP
NUT
POINTER KNOB
WASHER
NUT
BOOT
PUSH BUTTON SWITCH
WASHER
NUT
BOOT
NUT
POINTER KNOB
NUT
POINTER KNOB
C
ME-5-6115-434-12/3-16 ④

Figure 3-16. Instrument panel assembly component replacement (Sheet 4 of 4).

(3) *Installation.* Install in reverse order of removal procedures.

e. Push Button Switch (S23, S24).

(1) *Removal.* Tag and disconnect electrical connections to switch. Remove nut and washer attaching switch to panel. Remove switch and seal from panel.

(2) *Cleaning and inspection.*

(*a*) Clean switch with filtered compressed air or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(3) *Installation.* Install in reverse order of removal instructions.

f. Switch (S5).

(1) *Removal.* Tag and disconnect electrical connections to switch. Remove nut and washer attaching switch and switch guard to panel. Remove switch, switch guard and boot from panel.

(2) *Cleaning and inspection.*

(*a*) Clean switch with filtered compressed air or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect switch for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install switch in reverse order of removal procedures.

g. Rotary Switch (S25, S26).

(1) *Removal.* Tag and disconnect electrical connections to switch. Loosen set screw in switch knob. Remove knob from switch. Remove four screws, eight washers from switch. Remove switch and grommet from panel.

(2) *Cleaning and inspection.*

(*a*) Clean switch with filtered compressed air and electricians brush or clean switch with an approved cleaning solvent and electricians brush.

(*b*) Visually inspect switch for corrosion, cracks, damaged threads, proper alignment of contacts and other evidence of damage.

(3) *Installation.* Install switch in reverse order of removal procedures.

h. Rotary Switch (S14, S15, S16, S31),

(1) *Removal.* Tag and disconnect electrical connections to switch. Loosen set screw in switch knob. Remove knob from switch. Remove nut and washer attaching switch to panel. Remove switch and shaft seal from panel.

(2) *Cleaning and inspection.*

(*a*) Clean switch with filtered compressed air and electricians brush or clean with an approved cleaning solvent and electricians brush.

(*b*) Visually inspect switch for corrosion, cracks, damaged threads, proper alignment of contacts and other evidence of damage.

(3) *Installation.* Install switch in reverse order of removal procedures.

i. Circuit Breaker (CB5, CB11, CB12, CB22).

(1) *Removal.* Tag and disconnect electrical connections to circuit breaker. Remove nut and washer attaching circuit breaker to panel. Remove circuit breaker and seal from panel.

(2) *Cleaning and inspection.*

(*a*) Clean circuit breaker with filtered compressed air or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect circuit breaker for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

j. Circuit Breaker (CB1, CB2, CB9).

(1) *Removal.* Tag and disconnect electrical connections to circuit breaker. Remove circuit breaker and boot from panel.

(2) *Cleaning and inspection.*

(*a*) Clean circuit breaker with filtered compressed air or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect circuit breaker for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

3-56. Conditioned Air System Circuit Breaker Panel (fig. 3-17)

Warning: **Electrical power shall be shut off prior to maintenance on electrical components.**

Note. Access to the conditioned air system circuit breaker panel is obtained by removing two bolts and two washers from each end of the panel and extending panel outward on its electrical harness.

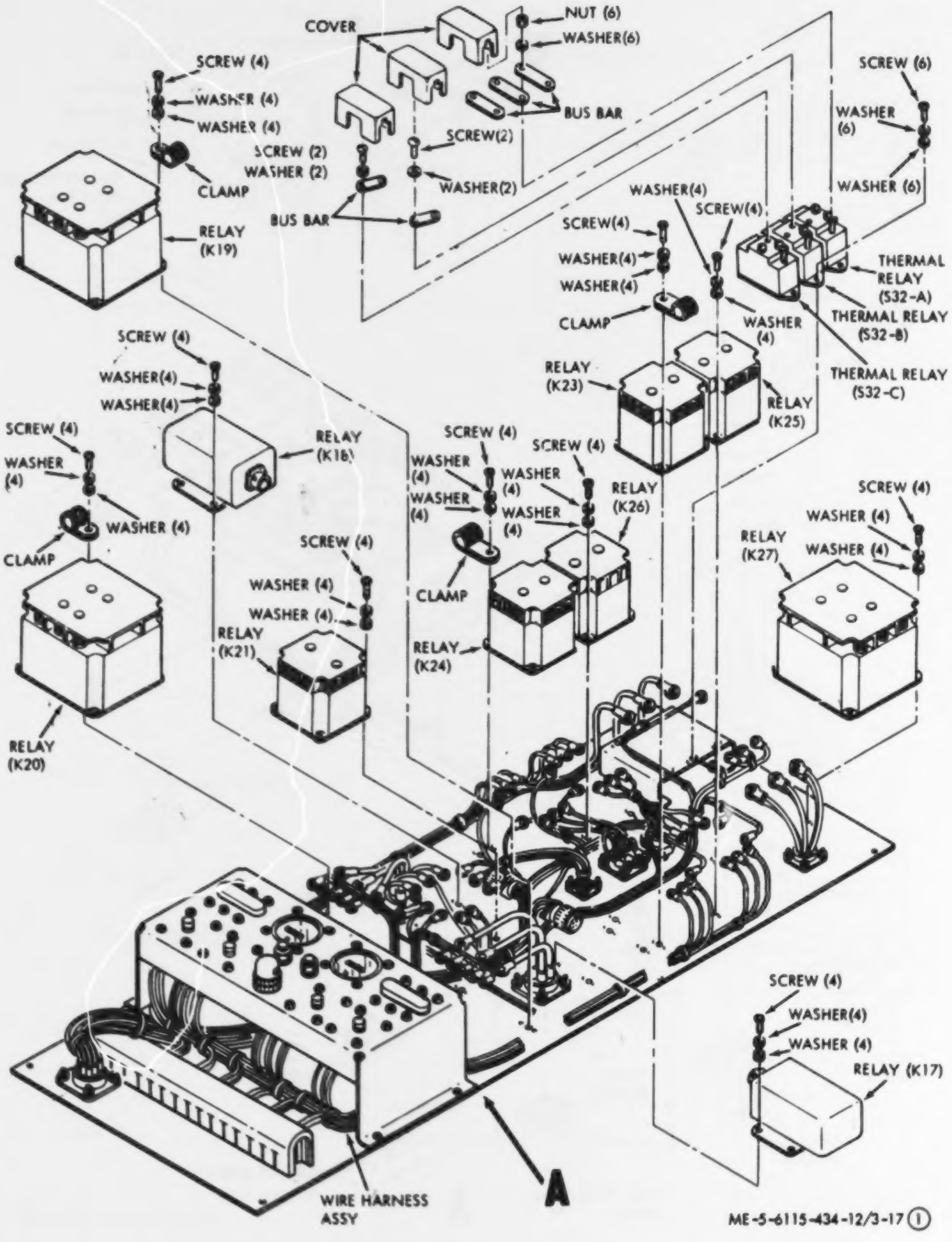

COVER
NUT (6)
WASHER(6)
SCREW (4)
WASHER (4)
WASHER (4)
BUS BAR
SCREW (6)
WASHER (6)
SCREW (2)
WASHER (2)
SCREW(2)
CLAMP
WASHER(2)
WASHER (6)
BUS BAR
WASHER(4)
SCREW(4)
RELAY (K19)
SCREW(4)
WASHER(4)
WASHER(4)
THERMAL RELAY (S32-A)
CLAMP
THERMAL RELAY (S32-B)
WASHER (4)
SCREW (4)
WASHER(4)
WASHER(4)
RELAY (K23)
THERMAL RELAY (S32-C)
RELAY (K25)
SCREW (4)
RELAY (K18)
SCREW (4)
WASHER (4)
SCREW (4)
WASHER (4)
WASHER (4)
WASHER (4)
WASHER (4)
RELAY (K26)
WASHER (4)
WASHER (4)
SCREW (4)
WASHER (4)
CLAMP
SCREW (4)
WASHER (4)
RELAY (K27)
WASHER (4)
WASHER (4)
CLAMP
WASHER (4)
RELAY (K21)
RELAY (K24)
RELAY (K20)
SCREW (4)
WASHER(4)
WASHER (4)
RELAY (K17)
A
WIRE HARNESS ASSY
ME-5-6115-434-12/3-17 ①

Figure 3-17. Conditioned air system circuit breaker and control panel component replacement (Sheet 1 of 2).

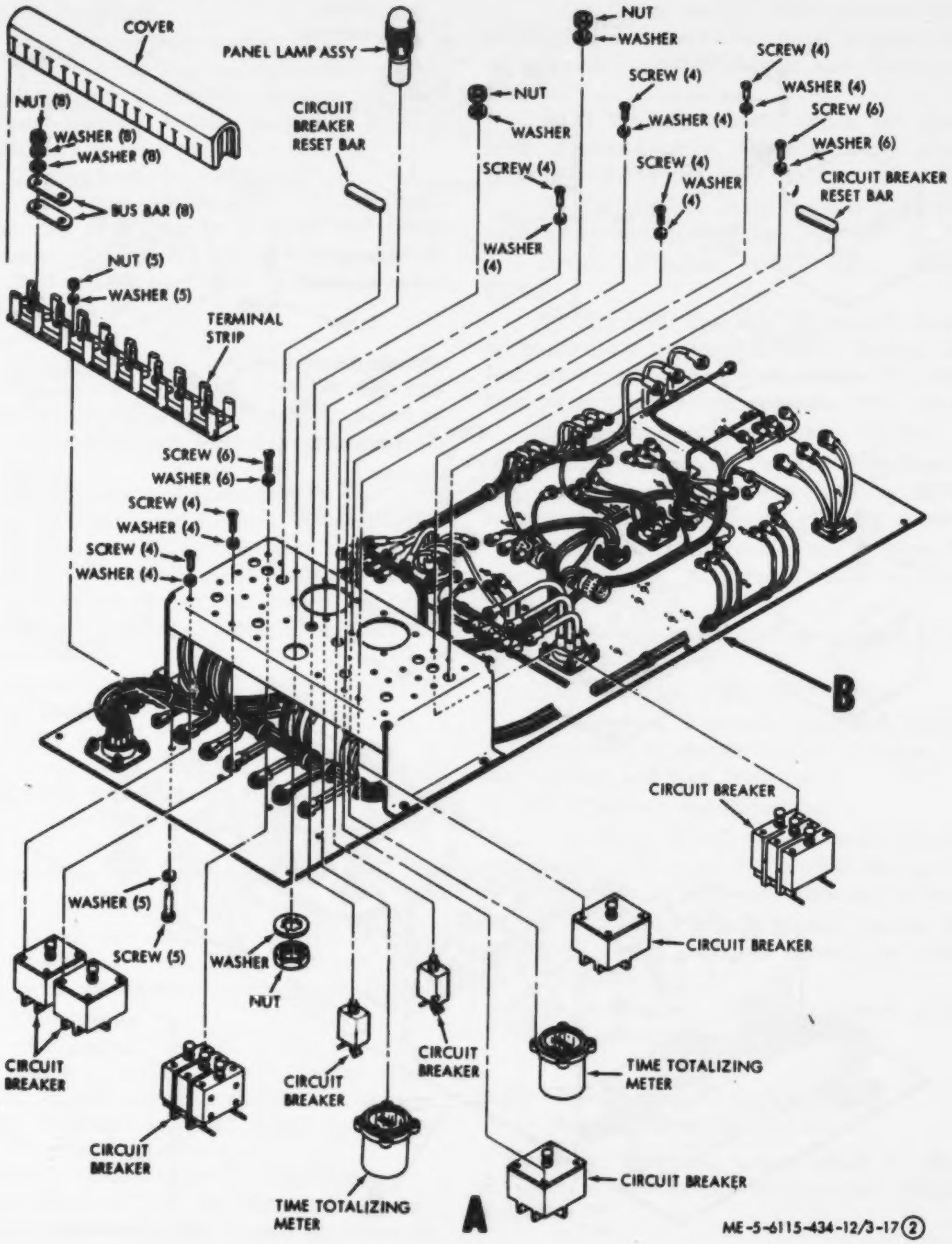

COVER
PANEL LAMP ASSY
NUT
WASHER
SCREW (4)
WASHER (4)
SCREW (6)
WASHER (6)
CIRCUIT BREAKER RESET BAR
NUT (8)
WASHER (8)
WASHER (8)
BUS BAR (8)
CIRCUIT BREAKER RESET BAR
NUT
WASHER
SCREW (4)
WASHER (4)
SCREW (4)
WASHER (4)
SCREW (4)
WASHER (4)
NUT (5)
WASHER (5)
TERMINAL STRIP
SCREW (6)
WASHER (6)
SCREW (4)
WASHER (4)
SCREW (4)
WASHER (4)
B
CIRCUIT BREAKER
WASHER (5)
SCREW (5)
WASHER
NUT
CIRCUIT BREAKER
CIRCUIT BREAKER
CIRCUIT BREAKER
CIRCUIT BREAKER
TIME TOTALIZING METER
CIRCUIT BREAKER
CIRCUIT BREAKER
TIME TOTALIZING METER
CIRCUIT BREAKER
A
ME-5-6115-434-12/3-17②

Figure 3-17. Conditioned air system circuit breaker and control panel component replacement (Sheet 2 of 3).

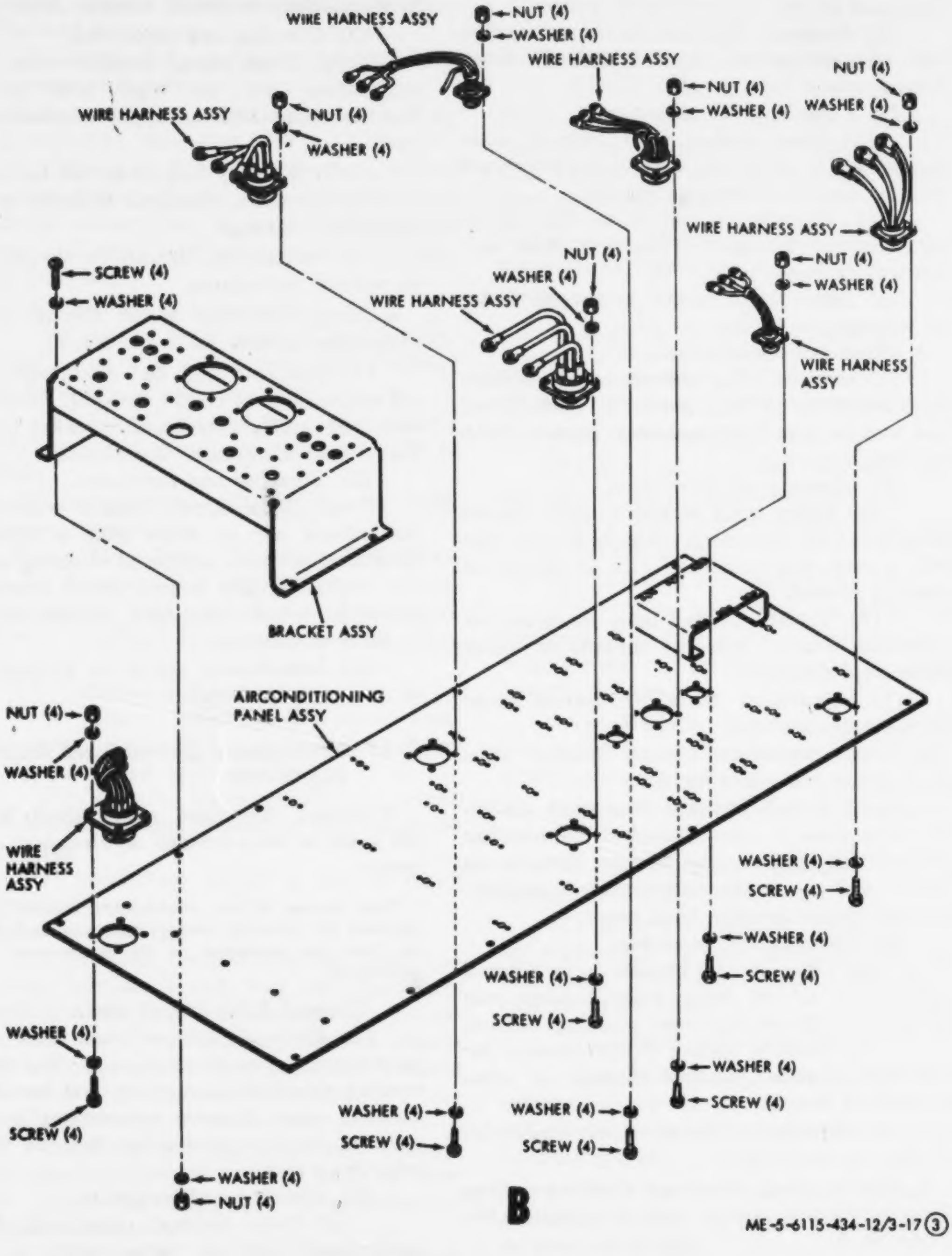

WIRE HARNESS ASSY
NUT (4)
WASHER (4)
WIRE HARNESS ASSY
WIRE HARNESS ASSY
NUT (4)
WASHER (4)
NUT (4)
WASHER (4)
NUT (4)
WASHER (4)
WIRE HARNESS ASSY
NUT (4)
WASHER (4)
SCREW (4)
WASHER (4)
NUT (4)
WASHER (4)
WIRE HARNESS ASSY
WIRE HARNESS ASSY
BRACKET ASSY
AIRCONDITIONING PANEL ASSY
NUT (4)
WASHER (4)
WIRE HARNESS ASSY
WASHER (4)
SCREW (4)
WASHER (4)
SCREW (4)
WASHER (4)
SCREW (4)
WASHER (4)
SCREW (4)
WASHER (4)
SCREW (4)
WASHER (4)
SCREW (4)
WASHER (4)
SCREW (4)
WASHER (4)
NUT (4)
B
ME-5-6115-434-12/3-17 ③

Figure 3-17. Conditioned air system circuit breaker and control panel component replacement (Sheet 3 of 3).

a. Time Totalizing Meter (two used system No. 1 and No. 2)

(1) *Removal.* Tag and disconnect electrical connections to time totalizing meter. Remove meter from panel.

(2) *Cleaning and inspection.*

(*a*) Clean meter with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect meter for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

b. Panel Lamp Assembly.

(1) *Removal.* Tag and disconnect electrical connections to lamp assembly. Remove nut and washer from lamp assembly. Remove lamp assembly from panel.

(2) *Cleaning and inspection.*

(*a*) Clean lamp assembly with filtered compressed air and electricians brush or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect lamp assembly for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

c. Compressor Motor Circuit Breaker. (two used, system No. 1 and No. 2)

(1) *Removal.* Tag and disconnect electrical connections to circuit breaker. Remove bar from circuit breaker push buttons. Remove six screws and six washers from circuit breaker. Remove circuit breaker from panel.

(2) *Cleaning and inspection.*

(*a*) Clean circuit breaker with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect circuit breaker for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

d. Recirculating Fans and Condenser Fans Circuit Breakers (two of each used, system No. 1 and No. 2)

(1) *Removal.* Tag and disconnect electrical connections to circuit breaker. Remove four screws and four washers from circuit breaker. Remove circuit breaker from panel.

(2) *Cleaning and inspection.*

(*a*) Clean circuit breaker with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect circuit breaker for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

e. Time Totalizing Meter Circuit Breaker (two used, system No. 1 and No. 2)

(1) *Removal.* Tag and disconnect electrical connections to circuit breaker. Remove nut and washer attaching circuit breaker to panel. Remove circuit breaker from panel.

(2) *Cleaning and inspection.*

(*a*) Clean circuit breaker with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect circuit breaker for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

3-57. Environment Control Panel Assembly (fig. 3-17)

Warning: **Electrical power shall be shut off prior to maintenance on electrical components.**

Note. Access to the environment control panel is obtained by removing twenty bolts and twenty washers from the perimeter of the environment control panel cover.

a. Thermal Relay (three used).

(1) *Removal.* Remove cover from electrical connections on thermal relay. Tag and disconnect electrical connections and bus bars to thermal relay. Remove two screws and four washers from thermal relay. Remove thermal relay from panel.

(2) *Cleaning and inspection.*

(*a*) Clean thermal relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect thermal relay for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation*. Install in reverse order of removal procedures.

b. Relay Armature (eight used, K19, K20, K21, K23, K24, K25, K26, K27).

(1) *Removal*. Remove cover from electrical connections on relay. Tag and disconnect electrical connections to relay. Remove four screws and eight washers from relay. Remove relay from panel.

(2) *Cleaning and inspection.*

(*a*) Clean relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect relay for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation*. Install in reverse order of removal procedures.

c. Relay, Time Delay (two used, K17, K18).

(1) *Removal*. Tag and disconnect electrical connection from relay. Remove four screws and eight washers from relay. Remove relay from panel.

(2) *Cleaning and inspection.*

(*a*) Clean relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect relay for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation*. Install in reverse order of removal procedures.

d. Terminal Strip.

(1) *Removal*. Remove terminal board cover from terminal board. Tag and disconnect electrical connections and bus bars to terminal board. Remove four nuts and washers attaching terminal board to panel assembly. Remove terminal board from panel assembly.

(2) *Cleaning and inspection.*

(*a*) Clean terminal board with filtered compressed air and electricians brush or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect terminal board for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation*. Install in reverse order of removal procedures.

3-58. Temperature Control Panel Assembly (fig. 3-18)

Maintenance procedures for components mounted on the temperature control panel consists of cleaning, removal and replacement of damaged components.

Warning: **Electrical power shall be shut off prior to maintenance on electrical components.**

Note. Access to the temperature control panel is obtained by removing four bolts and four washers from the perimeter of panel. Carefully work panel out far enough to gain access to component parts.

a. Panel Illumination Lamp.

(1) *Removal*. Tag and disconnect electrical connections to lamp assembly. Remove nut and washer from lamp assembly. Remove lamp assembly from panel.

(2) *Cleaning and inspection.*

(*a*) Clean lamp assembly with filtered compressed air and electricians brush or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect lamp assembly for corrosion, cracks, damaged threads, or other evidence of damage.

(3) *Installation*. Install in reverse order of removal procedure.

b. Cooled Air Lamp Assembly (two used, system No. 1 and No. 2).

(1) *Removal*. Tag and disconnect electrical connections to lamp assembly. Remove nut and washer from lamp assembly. Remove lamp assembly from panel.

(2) *Cleaning and inspection.*

(*a*) Clean lamp assembly with filtered compressed air and electricians brush or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect lamp assembly for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation*. Install in reverse order of removal procedure.

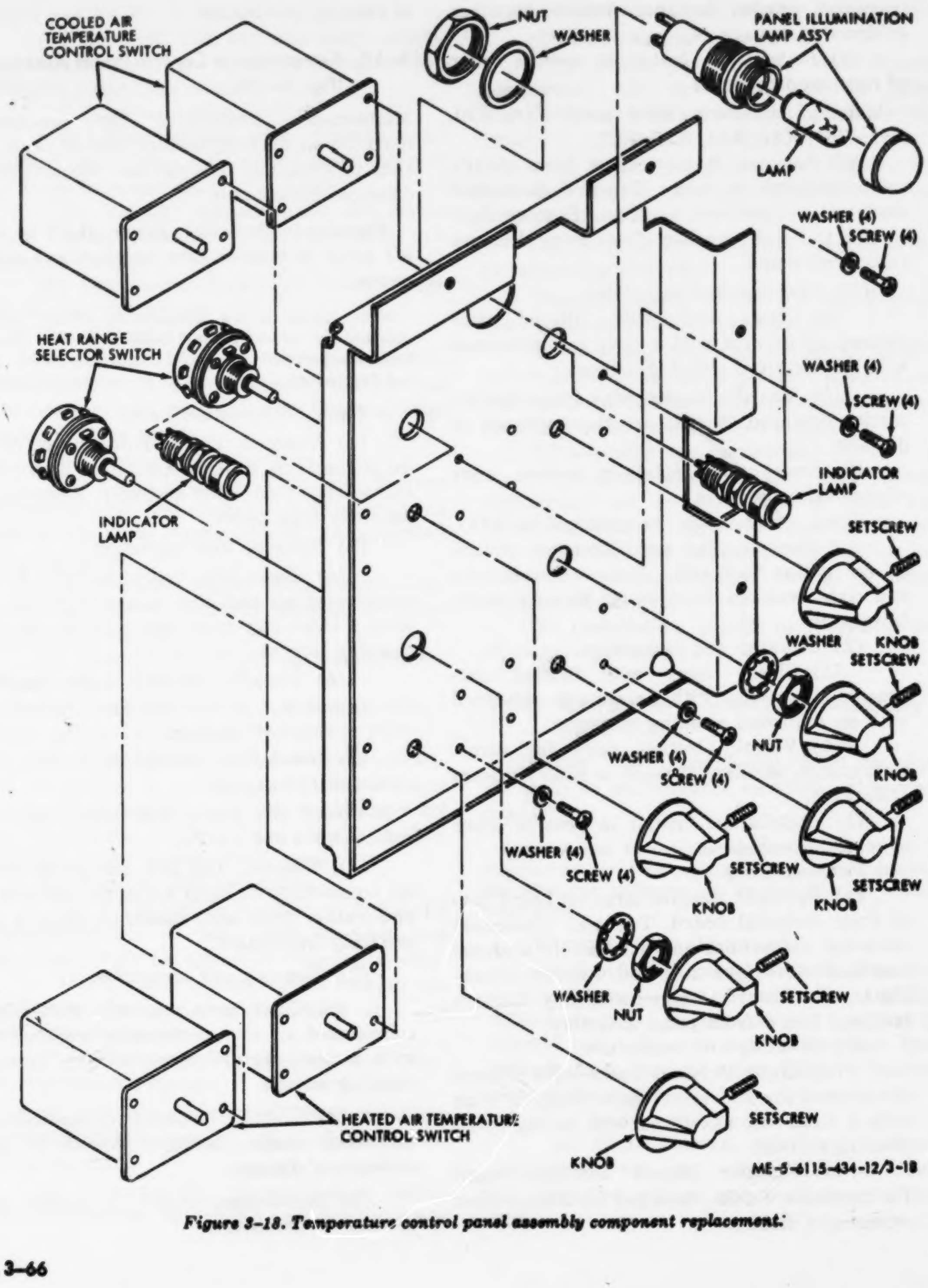

COOLED AIR TEMPERATURE CONTROL SWITCH
NUT
WASHER
PANEL ILLUMINATION LAMP ASSY
LAMP
WASHER (4)
SCREW (4)
HEAT RANGE SELECTOR SWITCH
WASHER (4)
SCREW (4)
INDICATOR LAMP
INDICATOR LAMP
SETSCREW
WASHER
KNOB
SETSCREW
NUT
WASHER (4)
SCREW (4)
KNOB
WASHER (4)
SCREW (4)
SETSCREW
SETSCREW
KNOB
KNOB
WASHER
NUT
SETSCREW
KNOB
HEATED AIR TEMPERATURE CONTROL SWITCH
SETSCREW
KNOB
ME-5-6115-434-12/3-18

Figure 3-18. Temperature control panel assembly component replacement.

c. Cooled Air Temperature Control Switch (two used, system No. 1 and No. 2).

(1) *Removal.* Tag and disconnect electrical connections to control switch. Loosen set screw on knob of control switch. Remove knob from control switch. Remove four screws and washers from control switch. Remove control switch from panel.

(2) *Cleaning and inspection.*

(*a*) Clean control switch with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect control switch for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedure.

d. Heating Range Selector Switch (two used, system No. 1 and No. 2)

(1) *Removal.* Tag and disconnect electrical connections to selector switch. Loosen set screw in selector switch knob. Remove knob from selector switch. Remove nut and washer from selector switch shaft. Remove selector switch from panel.

(2) *Cleaning and inspection.*

(*a*) Clean selector switch with filtered compressed air and electricians brush or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect selector switch for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedure.

e. Heated Air Temperature Control Switch (two used, system No. 1 and No. 2).

(1) *Removal.* Tag and disconnect electrical connections to control switch. Loosen set screw on control switch knob. Remove knob from control switch. Remove four screws and four washers from control switch. Remove control switch from panel.

(2) *Cleaning and inspection.*

(*a*) Clean control switch with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect control switch for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedure.

Section XI. 400 HZ AND 60 HZ ELECTRICAL SYSTEMS

3-59. General

The 400 Hz and 60 Hz electrical systems provide electrical power for operation of power unit motor driven equipment and for external applications. The two systems consist of 400 Hz and 60 Hz generators driven by the gas turbine engine. Various devices incorporated in the electrical systems provide generator control, internal electrical circuit control and protection, and external electrical circuit control and protection.

***Warning:* Electrical power shall be shut off prior to maintenance on electrical components.**

3-60. Wiring Harness Assemblies, Terminals, Electrical Leads, Wiring, Connectors, and Receptacles

a. Removal. Remove wiring harness assemblies, terminals, electrical leads, wiring, connectors, and receptacles as required for access to other components or to replace damaged parts.

Note. Tag or otherwise identify all connectors, terminals, electrical leads, wiring, and location of supporting clamps as removed to facilitate assembly.

b. Cleaning and Inspection.

(1) Clean parts with filtered compressed air, wiping with a clean rag moistened with an approved cleaning solvent, or by brushing with an electricians brush.

(2) Visually inspect for burned, bent, loose, corroded or otherwise damaged connector pins and terminals. Inspect insulation for burns, chafing, and deterioration. Inspect wiring for breaks, loose connections, or other obvious damage. Replace all damaged parts.

c. Repair. Replace damaged wires, terminals, connectors, and receptacles by unsoldering connections, installing replacement part and soldering in accordance with Military Specification MIL-S-6872 using SN60 solder that conforms to Federal Specification QQ-S-571.

Note. Refer to figures 1-17 through 1-20 for wire connection points and routing.

d. Test. Check continuity of wires using a multimeter or continuity light. Refer to figures 1-17 through 1-20 for wire routing. Continuity must be indicated through individual wires.

e. Installation. Install wiring harness assemblies, terminals, electrical leads, wiring, connectors, and receptacles in reverse order of removal procedures.

3-61. Upper Rack Assembly (fig. 3-19)

Note. Access to upper rack assembly is obtained by removing the gas turbine engine power plant access panel (fig. 1-2). Tag or otherwise identify electrical connections as removed to facilitate assembly.

a. Voltage Regulator (60 Hz).

(1) *Removal.* Tag and disconnect wiring harness connector plug from the voltage regulator. Remove four nuts, sixteen washers, and four screws. Remove regulator.

(2) *Cleaning and Inspection.*

(*a*) Clean voltage regulator with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent. Clean receptacle with filtered compressed air or an electricians brush.

(*b*) Visually inspect regulator for corrosion, cracks, damaged threads, or other evidence of damage.

(3) *Test.* Start the power unit as described in paragraph 2-14. Operate the 60 Hz electrical system as described in paragraph 2-16*a*. With the 60 Hz electrical system operating, disconnect plug (P32) from voltage regulator (VR2). Using an adjustable potentiometer, apply 24v ac through a 50 watt resistor into pins J and E on plug (P32). Adjust potentiometer until voltage begins to increase on panel AC voltmeter (fig. 2-19). If load contactor trip indicator lamp illuminates, reset load contactor switch (fig. 2-19) and increase voltage to 120v ac line to neutral. If 120 volts are obtainable and load contactor switch will remain in reset position regulator has failed.

(4) *Installation.* Install in reverse order of removal procedure.

b. Voltage Regulator (400 Hz).

(1) *Removal.* Tag and disconnect wiring harness connector plug from the voltage regulator. Remove four screws and eight washers. Remove regulator.

(2) *Cleaning and inspection.*

(*a*) Clean voltage regulator with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent. Clean receptacle with filtered compressed air or an electricians brush.

(*b*) Visually inspect regulator for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Test.* Start the power unit as described in paragraph 2-14. Operate the 400 Hz electrical system as described in paragraph 2-16*b*. With the 400 Hz electrical system operating, disconnect plug (P30) from voltage regulator (VR1). Using an adjustable potentiometer, apply 24v ac through a 50 watt resistor into pins J and E on plug (P30). Adjust potentiometer until voltage begins to increase on panel AC voltmeter (fig. 2-20). If main contactor trip indicator lamp illuminates, reset main contactor switch (fig. 2-20) and increase voltage to 120v ac line to neutral. If 120 volts are obtainable and main contactor switch will remain in reset position, regulator has failed.

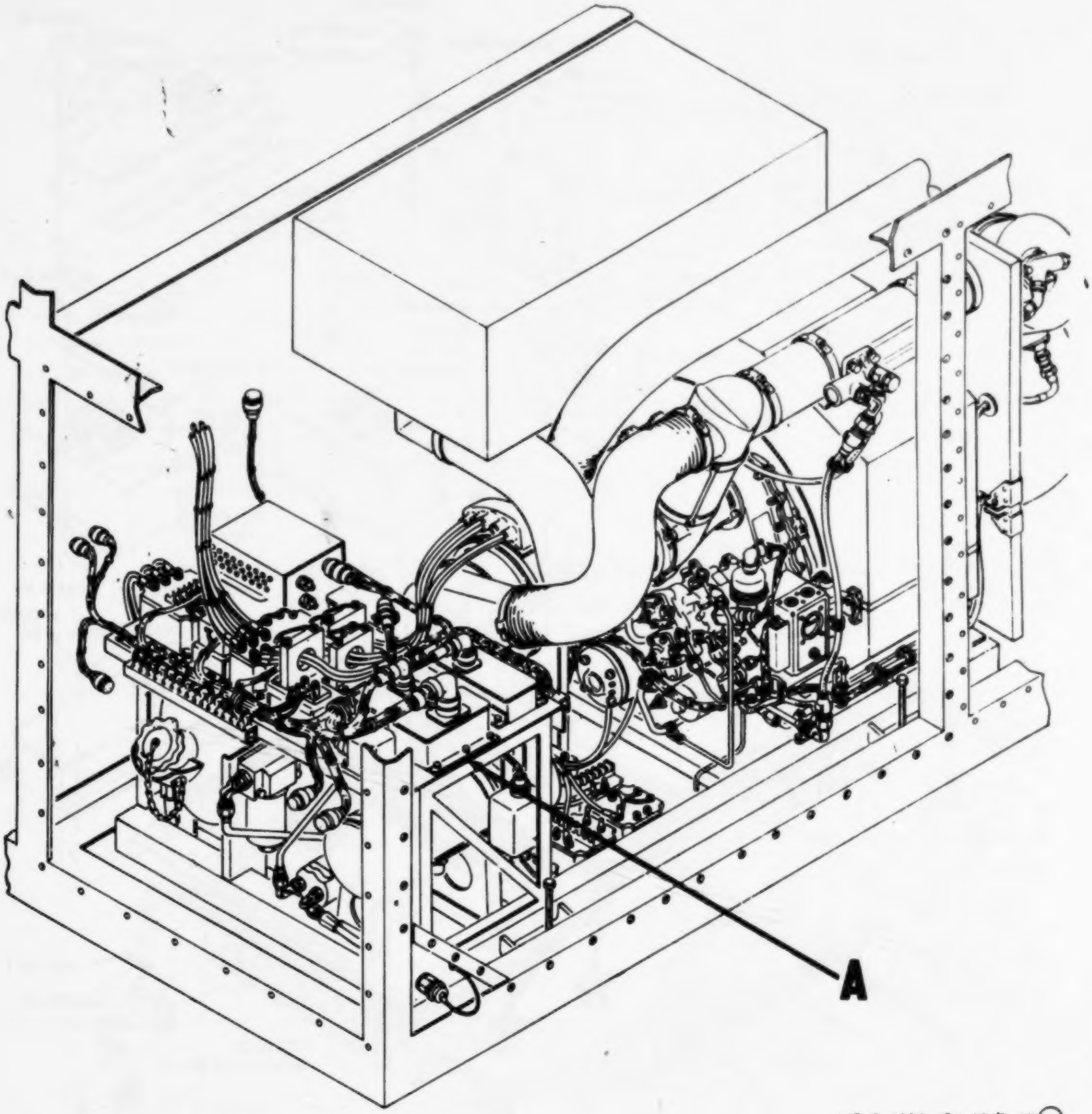
(4) *Installation.* Install in reverse order of removal procedures.

c. Relay Assembly (two used).

(1) *Removal.* Tag and disconnect wiring harness connector plug from the relay assembly. Remove six screws and twelve washers. Remove relay.

(2) *Cleaning and inspection.*

(*a*) Clean relay assembly with filtered compressed air or wipe with a clean rag moist-



ME-5-6115-434-12/3-19 ①

Figure 3-19. Upper rack assembly component replacement (Sheet 1 of 3).

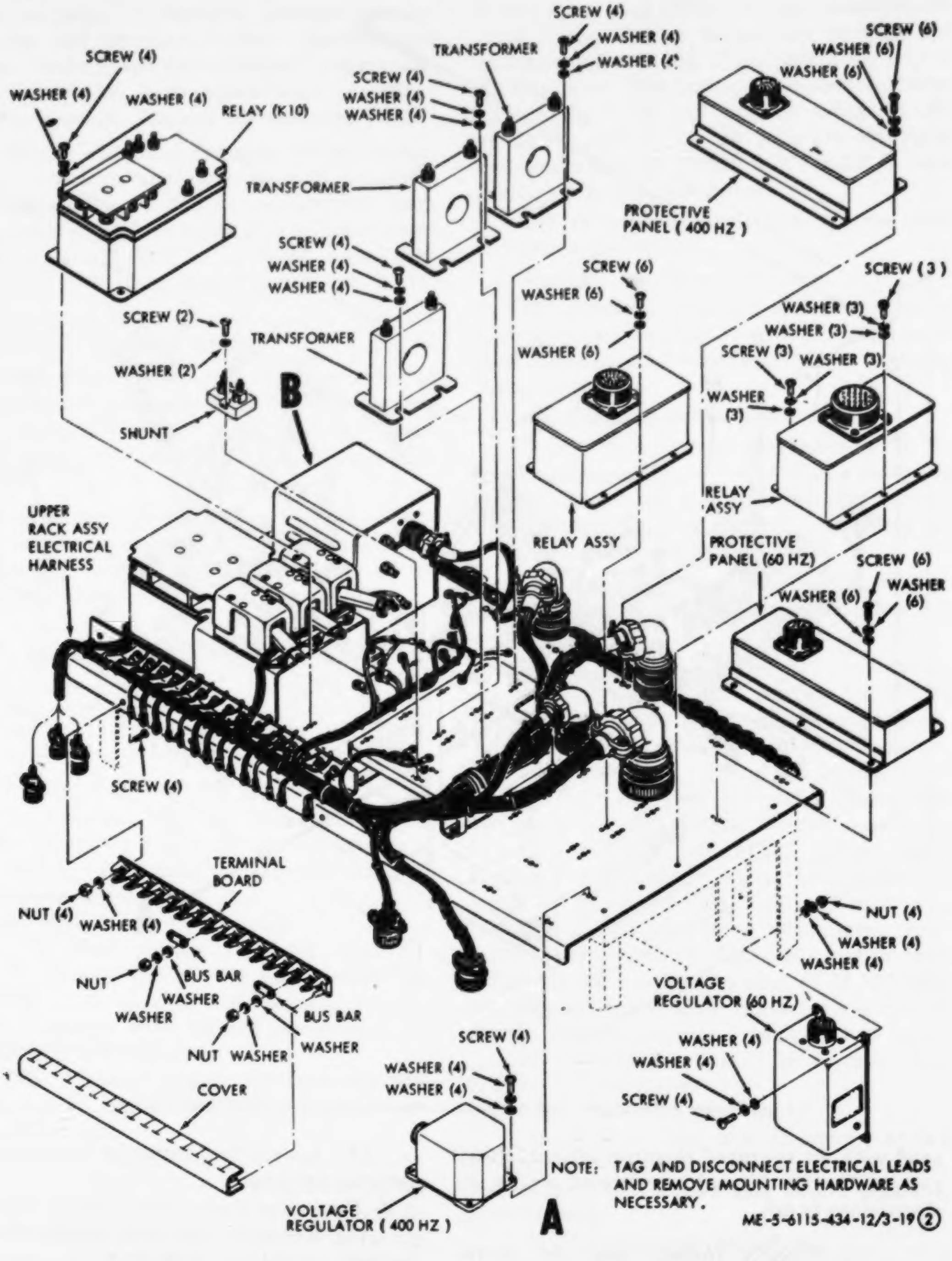
ened with an approved cleaning solvent. Clean receptacle with filtered compressed air or an electricians brush.

(*b*) Visually inspect relay for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedure.

d. Protective Panel (two used).

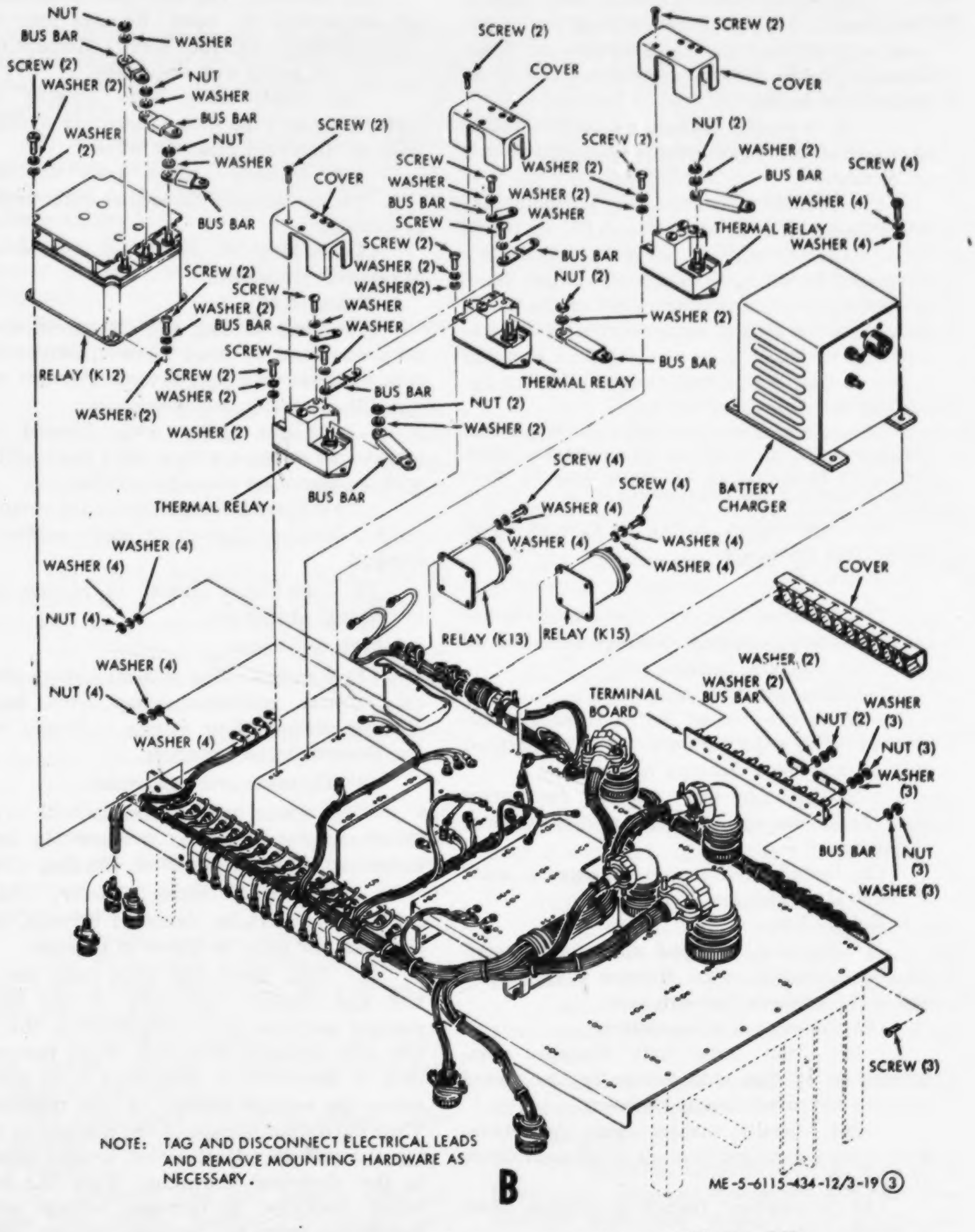
(1) *Removal.* Tag and disconnect wiring harness connector plug from the protective panel. Remove six screws and twelve washers. Remove protective panel.


SCREW (4)
WASHER (4)
WASHER (4)
RELAY (K10)
TRANSFORMER
SCREW (4)
WASHER (4)
WASHER (4)
SCREW (4)
WASHER (4)
WASHER (4)
SCREW (6)
WASHER (6)
WASHER (6)
TRANSFORMER
PROTECTIVE PANEL (400 HZ)
SCREW (4)
WASHER (4)
WASHER (4)
SCREW (6)
WASHER (6)
WASHER (6)
SCREW (3)
WASHER (3)
WASHER (3)
SCREW (3)
WASHER (3)
WASHER (3)
SCREW (2)
WASHER (2)
TRANSFORMER
SHUNT
B
RELAY ASSY
RELAY ASSY
UPPER RACK ASSY ELECTRICAL HARNESS
PROTECTIVE PANEL (60 HZ)
SCREW (6)
WASHER (6)
WASHER (6)
SCREW (4)
TERMINAL BOARD
NUT (4)
WASHER (4)
NUT
BUS BAR
WASHER
WASHER
BUS BAR
NUT
WASHER
WASHER
NUT (4)
WASHER (4)
WASHER (4)
VOLTAGE REGULATOR (60 HZ)
COVER
SCREW (4)
WASHER (4)
WASHER (4)
WASHER (4)
WASHER (4)
SCREW (4)
VOLTAGE REGULATOR (400 HZ)
A

NOTE: TAG AND DISCONNECT ELECTRICAL LEADS AND REMOVE MOUNTING HARDWARE AS NECESSARY.

ME-5-6115-434-12/3-19 ②

Figure 3-19. Upper rack assembly component replacement (Sheet 2 of 3).


NUT
BUS BAR
WASHER
SCREW (2)
WASHER (2)
NUT
WASHER
BUS BAR
WASHER (2)
NUT
WASHER
BUS BAR
RELAY (K12)
SCREW (2)
WASHER (2)
WASHER (2)
SCREW (2)
COVER
SCREW
BUS BAR
WASHER
SCREW
WASHER
SCREW (2)
WASHER (2)
WASHER (2)
THERMAL RELAY
BUS BAR
NUT (2)
WASHER (2)
SCREW (2)
COVER
SCREW
WASHER
BUS BAR
SCREW
WASHER
SCREW (2)
WASHER (2)
WASHER(2)
THERMAL RELAY
NUT (2)
WASHER (2)
BUS BAR
SCREW (2)
COVER
SCREW (2)
WASHER (2)
WASHER (2)
NUT (2)
WASHER (2)
BUS BAR
THERMAL RELAY
SCREW (4)
WASHER (4)
WASHER (4)
BATTERY CHARGER
SCREW (4)
WASHER (4)
WASHER (4)
SCREW (4)
WASHER (4)
WASHER (4)
RELAY (K13)
RELAY (K15)
COVER
WASHER (4)
WASHER (4)
NUT (4)
WASHER (4)
NUT (4)
WASHER (4)
TERMINAL BOARD
WASHER (2)
WASHER (2)
BUS BAR
NUT (2)
WASHER (3)
NUT (3)
WASHER (3)
BUS BAR
NUT (3)
WASHER (3)
SCREW (3)
B
ME-5-6115-434-12/3-19 ③

NOTE: TAG AND DISCONNECT ELECTRICAL LEADS AND REMOVE MOUNTING HARDWARE AS NECESSARY.

Figure 3-19. Upper rack assembly component replacement (Sheet 3 of 3).

(2) *Cleaning and Inspection.*

(*a*) Clean panel assembly with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent. Clean receptacle with filtered compressed air or an electricians brush.

(*b*) Visually inspect panel for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Test.* If either the 400 Hz main contactor trip indicator lamp (fig. 2-20) or the 60 Hz load contactor trip indicator lamp illuminates and 60 Hz or 400 Hz power is lost, reset the 400 Hz main contactor switch or the 60 Hz load contactor switch, as applicable. If the system trip indicator lamp again illuminates and power is lost, the protective panel for the applicable system has failed.

Note. If upon resetting either the 60 Hz load contactor switch or the 400 Hz main contactor switch, the system ammeter pegs full scale, check for short circuit or overload condition in system.

(4) *Installation.* Install in reverse order of removal procedure.

e. Relay (K10).

(1) *Removal.* Tag and disconnect electrical connections to relay. Remove four screws and eight washers. Remove relay.

(2) *Cleaning and inspection.*

(*a*) Clean relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect relay for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

f. Relay (K12).

(1) *Removal.* Tag and disconnect electrical connections to relay. Remove four screws and eight washers. Remove relay.

(2) *Cleaning and inspection.*

(*a*) Clean relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect relay for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedure

g. Relay (K13).

(1) *Removal.* Tag and disconnect electrical connections to relay. Remove four nuts, sixteen washers and four screws. Remove relay.

(2) *Cleaning and inspection.*

(*a*) Clean relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect relay for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedure.

h. Relay (K15).

(1) *Removal.* Tag and disconnect electrical connections to relay. Remove four nuts sixteen washers, and four screws. Remove relay.

(2) *Cleaning and inspection.*

(*a*) Clean relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect relay for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedure.

i. Battery Charger.

(1) *Removal.* Tag and disconnect electrical harness connector plug from battery charger. Remove four screws and eight washers. Remove battery charger.

(2) *Cleaning and inspection.*

(*a*) Clean battery charger with dry filtered compressed air or a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect battery charger for corrosion, cracks, damaged threads, excessive heat, or other evidence of damage.

(3) *Test.* Disconnect leads from the positive and negative terminals on the battery charger and connect a multimeter to the positive and negative terminals. Start the power unit as described in paragraph 2-14 and observe the voltage output on the multimeter. Vary the output voltage of the charger by turning the voltage adjust screw, located adjacent to the electrical connector. Turn the adjust screw clockwise to increase voltage output, counterclockwise to decrease voltage output.

Caution: **Do not exceed an output of 30 volts.**

If output voltage can be read on the multimeter and the voltage can be adjusted between 24 volts and 30 volts, the charger is operating satisfactorily.

(4) *Adjustment.* With the leads disconnected from the positive and negative terminals and a multimeter connected, turn the voltage adjust screw until the voltage output is 28 volts. Disconnect the multimeter and reconnect the leads to the positive and negative terminals.

(5) *Installation.* Install in reverse order of removal procedure.

j. Transformer 400 Hz (three used)

(1) *Removal.* Tag and disconnect electrical connections to transformer and electrical leads passing through the center of transformer. Remove four screws and eight washers from transformer. Remove transformer.

(2) *Cleaning and inspection.*

(*a*) Clean transformer with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect for corrosion, cracks, damaged threads, excessive heat or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedure.

k. Thermal Relay (three used).

(1) *Removal.* Remove two screws and cover from relay. Tag and remove electrical leads and bus bars from relay. Remove two screws and four washers from relay. Remove thermal relay.

(2) *Cleaning and inspection.*

(*a*) Clean relay with compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect relay for corrosion, cracks, damaged threads, excessive heat or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

l. Shunt.

(1) *Removal.* Tag and remove electrical leads from shunt. Remove two screws and washers from shunt. Remove shunt.

(2) *Cleaning and inspection.*

(*a*) Clean shunt with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect shunt for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

m. Terminal Board (two used)

(1) *Removal.* Remove snap on cover from terminal board. Tag and remove electrical connections and bus bars from terminal board. Remove two nuts, two washers and two screws from terminal board. Remove terminal board.

(2) *Cleaning and inspection.*

(*a*) Clean terminal board with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect terminal board for evidence of corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

3-62. Lower Rack Assembly (fig. 3-20)

Note. Access to lower rack assembly is obtained by removing the gas turbine engine power plant access panel (fig. 1-2) Tag or otherwise identify electrical connections as removed to facilitate assembly.

a. Relay (K1)

(1) *Removal.* Tag and disconnect electrical connections and bus bar from relay. Remove four screws and eight washers from relay. Remove relay.

(2) *Cleaning and Inspection.*

(*a*) Clean relay with filtered compressed air or wipe relay with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect relay for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

b. Relay (K11).

(1) *Removal.* Remove terminal post cover from relay. Tag and disconnect electrical connections from relay. Remove four screws and eight washers. Remove relay.

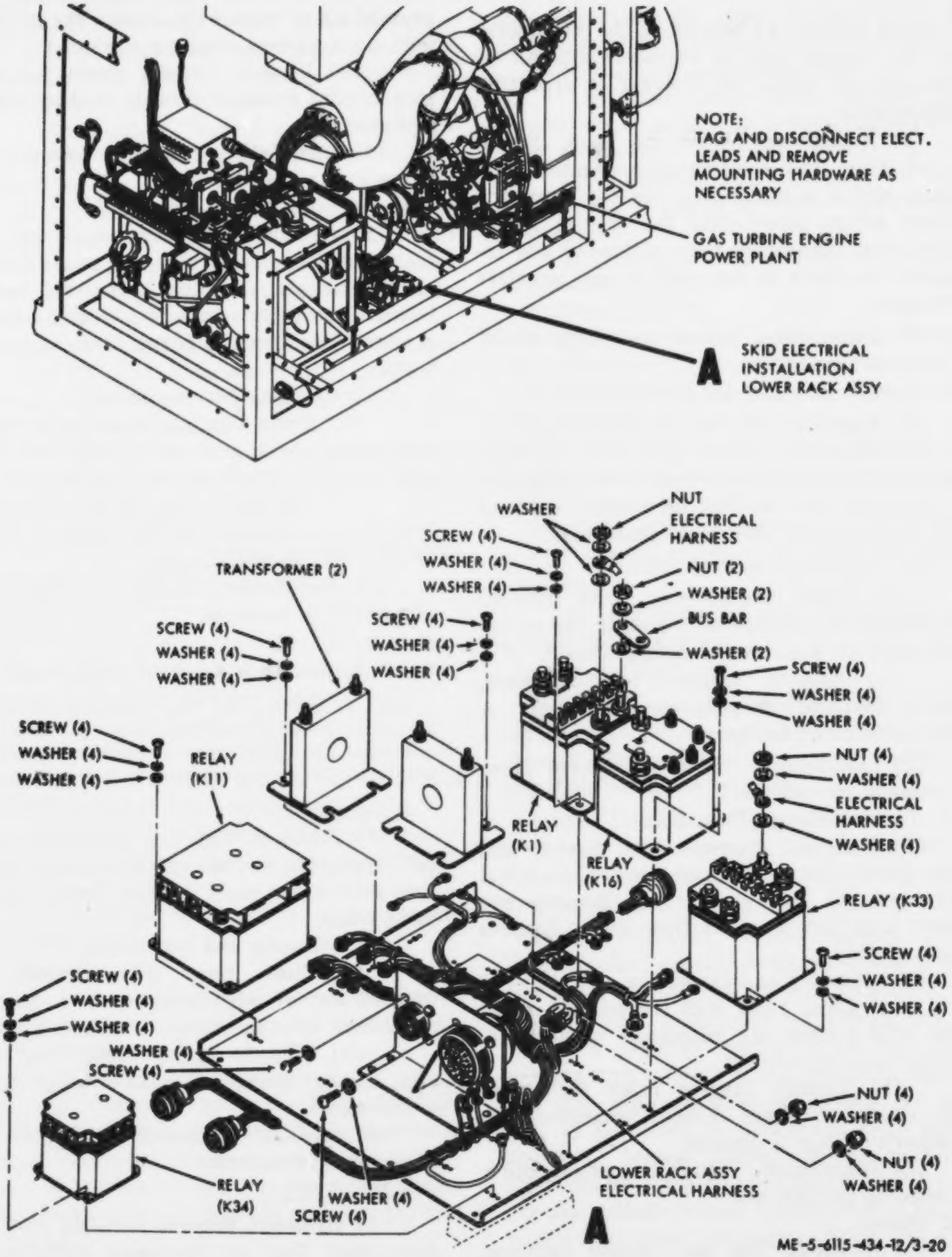

NOTE:
TAG AND DISCONNECT ELECT. LEADS AND REMOVE MOUNTING HARDWARE AS NECESSARY
GAS TURBINE ENGINE POWER PLANT
A
SKID ELECTRICAL INSTALLATION LOWER RACK ASSY
WASHER
NUT
ELECTRICAL HARNESS
SCREW (4)
WASHER (4)
WASHER (4)
NUT (2)
WASHER (2)
BUS BAR
WASHER (2)
TRANSFORMER (2)
SCREW (4)
WASHER (4)
WASHER (4)
SCREW (4)
WASHER (4)
WASHER (4)
SCREW (4)
WASHER (4)
WASHER (4)
SCREW (4)
WASHER (4)
WASHER (4)
RELAY (K11)
RELAY (K1)
RELAY (K16)
NUT (4)
WASHER (4)
ELECTRICAL HARNESS
WASHER (4)
RELAY (K33)
SCREW (4)
WASHER (4)
WASHER (4)
SCREW (4)
WASHER (4)
WASHER (4)
WASHER (4)
SCREW (4)
NUT (4)
WASHER (4)
NUT (4)
WASHER (4)
RELAY (K34)
WASHER (4)
SCREW (4)
LOWER RACK ASSY ELECTRICAL HARNESS
A
ME-5-6115-434-12/3-20

Figure 3-20. Lower rack assembly component replacement.

(2) *Cleaning and inspection.*

(*a*) Clean relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect relay for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

c. Relay (K16).

(1) *Removal.* Tag and disconnect electrical connections and bus bar from relay. Remove four screws and eight washers from relay. Remove relay.

(2) *Cleaning and inspection.*

(*a*) Clean relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

d. Relay (K33).

(1) *Removal.* Tag and disconnect electrical connectors from relay. Remove four screws and eight washers from relay. Remove relay.

(2) *Cleaning and inspection.*

(*a*) Clean relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

e. Relay (K34).

(1) *Removal.* Remove terminal post cover from relay. Tag and disconnect electrical connections from relay. Remove four screws and eight washers from relay. Remove relay.

(2) *Cleaning and inspection.*

(*a*) Clean relay with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(3) *Installation.* Install in reverse order of removal procedures.

f. Transformer (two used).

(1) *Removal.* Tag and disconnect electrical connections to transformer. Tag and disconnect electrical connection passing through the center of transformer. Remove four screws and eight washers from transformer. Remove transformer.

(2) *Cleaning and Inspection.*

(*a*) Clean transformer with filtered compressed air or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

3-63. Receptacle Panel Assembly (fig. 3-21)

Maintenance procedures for components mounted on the receptacle panel assembly consists of cleaning, removal and replacement of damaged components. Access to the receptacle panel assembly is obtained by removing sixteen bolts and sixteen washers from the perimeter of panel. Carefully work the panel assembly out far enough to gain access to the component parts.

Note. Electrical power shall be shut off prior to performing maintenance on the receptacle panel assembly.

a. Panel Illumination Lamp.

(1) *Removal.* Tag and disconnect electrical connections to lamp assembly. Remove nut and washer from lamp assembly. Remove lamp assembly.

(2) *Cleaning and inspection.*

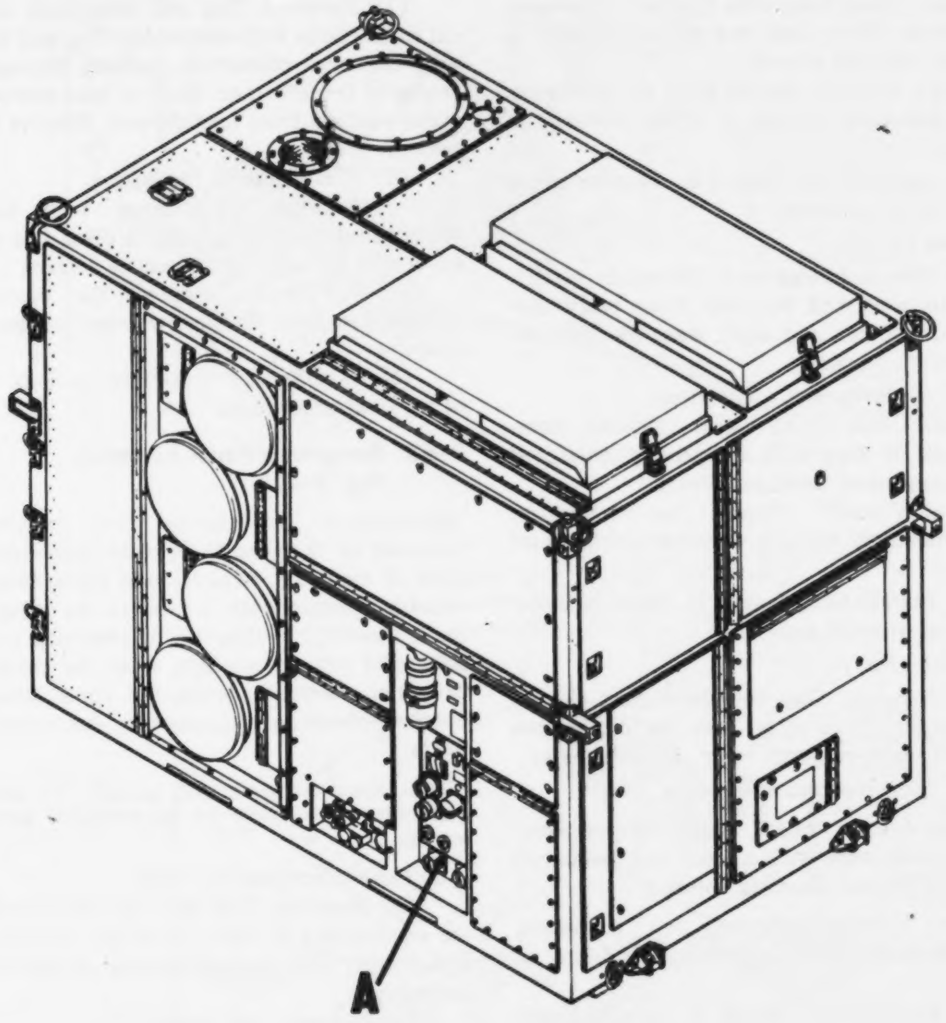
(*a*) Clean lamp assembly with filtered compressed air, and an electricians brush or wipe with a clean rag moistened with an approved cleaning solvent.

(*b*) Visually inspect lamp assembly for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

b. Cold Weather Heater and Battery Activation Switch (two used).

(1) *Removal.* Tag and disconnect electrical connections to switch. Remove two screws



ME-5-6115-434-12/3-21 ①

Figure 3-21. Receptacle panel assembly component replacement (Sheet 1 of 4).

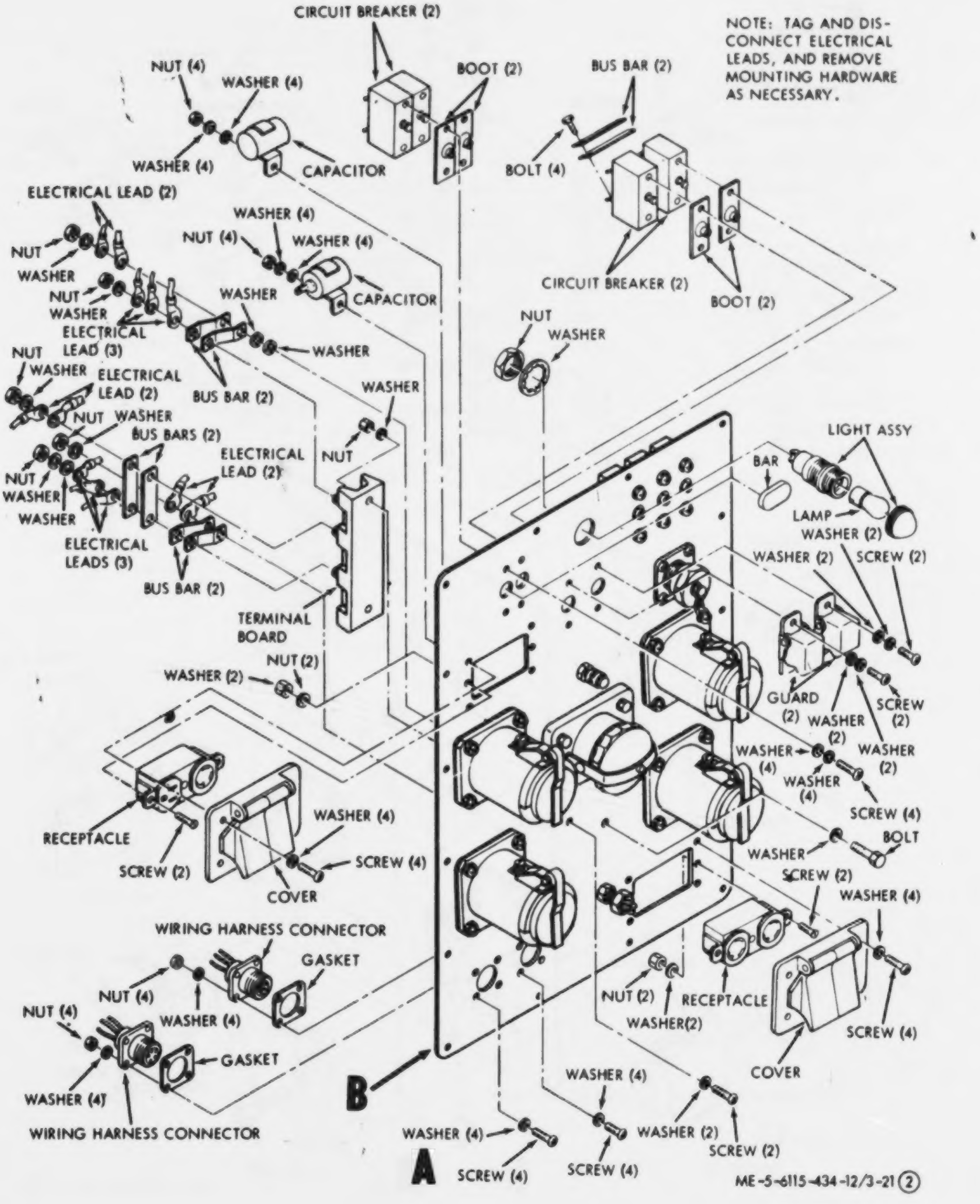
and four washers from switch. Remove switch, boot and switch guard.

(2) *Cleaning and inspection.*

(*a*) Clean switch with filtered compressed air or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect switch for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.


NOTE: TAG AND DISCONNECT ELECTRICAL LEADS, AND REMOVE MOUNTING HARDWARE AS NECESSARY.

CIRCUIT BREAKER (2)
NUT (4)
WASHER (4)
BOOT (2)
BUS BAR (2)
WASHER (4)
CAPACITOR
BOLT (4)
ELECTRICAL LEAD (2)
WASHER (4)
NUT (4)
WASHER (4)
NUT
WASHER
NUT
WASHER
CAPACITOR
CIRCUIT BREAKER (2)
BOOT (2)
WASHER
ELECTRICAL LEAD (3)
WASHER
NUT
WASHER
NUT
WASHER
ELECTRICAL LEAD (2)
BUS BAR (2)
WASHER
NUT
WASHER
BUS BARS (2)
LIGHT ASSY
NUT
WASHER
WASHER
ELECTRICAL LEAD (2)
NUT
BAR
LAMP
WASHER (2)
ELECTRICAL LEADS (3)
WASHER (2)
SCREW (2)
BUS BAR (2)
TERMINAL BOARD
NUT (2)
WASHER (2)
GUARD (2)
WASHER (2)
SCREW (2)
WASHER (4)
WASHER (2)
WASHER (4)
SCREW (4)
RECEPTACLE
WASHER (4)
SCREW (4)
WASHER
BOLT
SCREW (2)
COVER
SCREW (2)
WASHER (4)
WIRING HARNESS CONNECTOR
GASKET
NUT (4)
WASHER (4)
NUT (4)
NUT (2)
WASHER(2)
RECEPTACLE
SCREW (4)
GASKET
WASHER (4)
COVER
WASHER (4)
B
WASHER (4)
WIRING HARNESS CONNECTOR
WASHER (4)
WASHER (2)
SCREW (2)
A
SCREW (4)
SCREW (4)

ME-5-6115-434-12/3-21 ②

Figure 3-21. Receptacle panel assembly component replacement (Sheet 2 of 4)

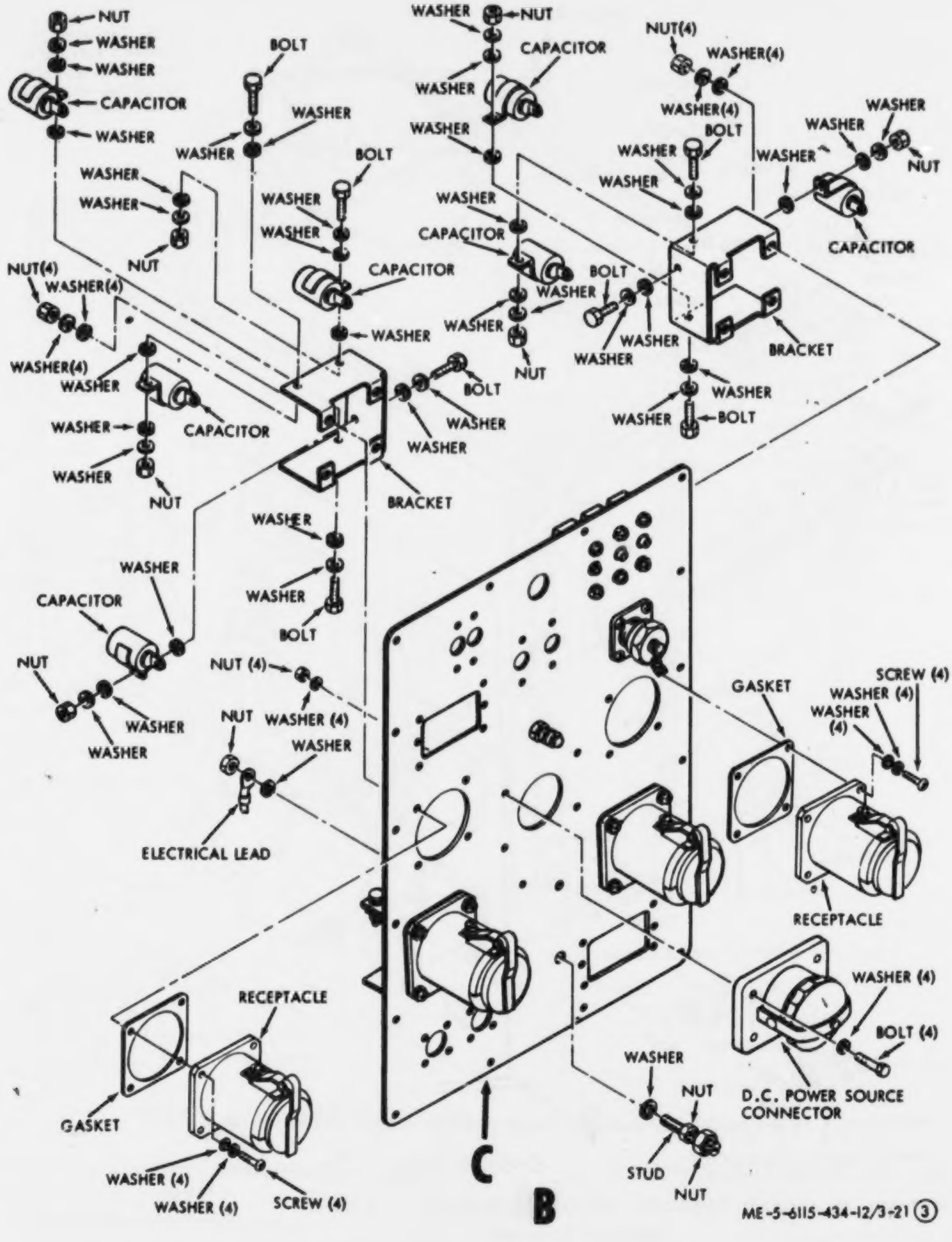
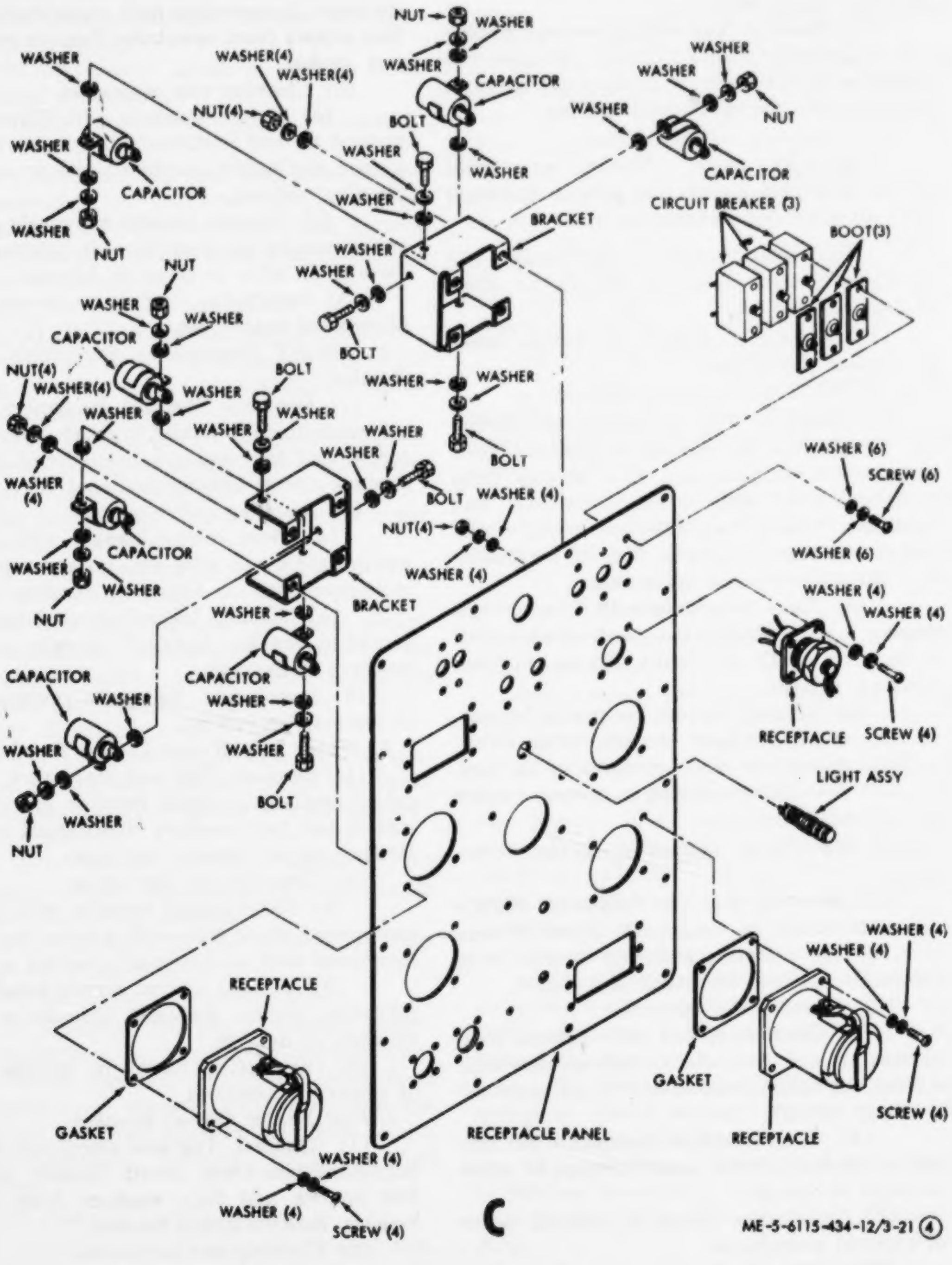

NUT
WASHER
WASHER
CAPACITOR
WASHER
BOLT
WASHER
WASHER
WASHER
WASHER
NUT
BOLT
WASHER
WASHER
CAPACITOR
WASHER
NUT(4)
WASHER(4)
WASHER(4)
WASHER
CAPACITOR
WASHER
WASHER
NUT
BOLT
WASHER
WASHER
BRACKET
WASHER
NUT
CAPACITOR
WASHER
WASHER
WASHER
CAPACITOR
WASHER
WASHER
NUT
BOLT
WASHER
WASHER
WASHER
NUT(4)
WASHER(4)
WASHER(4)
WASHER
BOLT
WASHER
WASHER
WASHER
WASHER
NUT
CAPACITOR
BRACKET
WASHER
WASHER
BOLT
WASHER
WASHER
BOLT
WASHER
CAPACITOR
NUT
WASHER
WASHER
NUT (4)
WASHER (4)
NUT
WASHER
ELECTRICAL LEAD
GASKET
SCREW (4)
WASHER (4)
WASHER (4)
RECEPTACLE
WASHER (4)
BOLT (4)
D.C. POWER SOURCE CONNECTOR
RECEPTACLE
GASKET
WASHER (4)
WASHER (4)
SCREW (4)
C
B
WASHER
NUT
STUD
NUT
ME-5-6115-434-12/3-21 ③

Figure 3-21. Receptacle panel assembly component replacement (Sheet 3 of 4).


NUT
WASHER
WASHER
CAPACITOR
WASHER
WASHER(4)
WASHER(4)
NUT(4)
BOLT
WASHER
WASHER
NUT
WASHER
WASHER
CAPACITOR
WASHER
CAPACITOR
WASHER
WASHER
NUT
WASHER
WASHER
BRACKET
CIRCUIT BREAKER (3)
BOOT(3)
WASHER
WASHER
BOLT
NUT
WASHER
WASHER
CAPACITOR
NUT(4)
WASHER(4)
WASHER
WASHER
BOLT
WASHER
WASHER
WASHER
WASHER
WASHER
BOLT
WASHER
WASHER
BOLT
WASHER (4)
(4)
NUT(4)
WASHER (4)
CAPACITOR
WASHER
WASHER
NUT
BRACKET
WASHER (6)
SCREW (6)
WASHER (6)
WASHER
CAPACITOR
WASHER
WASHER
BOLT
WASHER (4)
WASHER (4)
RECEPTACLE
SCREW (4)
CAPACITOR
WASHER
WASHER
WASHER
NUT
LIGHT ASSY
RECEPTACLE
GASKET
WASHER (4)
WASHER (4)
WASHER (4)
SCREW (4)
RECEPTACLE PANEL
GASKET
RECEPTACLE
WASHER (4)
WASHER (4)
SCREW (4)
C

ME-5-6115-434-12/3-21 ④

Figure 3-21. Receptacle panel assembly component replacement (Sheet 4 of 4).

c. 60 HZ Convenience Receptacle Circuit Breaker (two used).

(1) *Removal.* Tag and disconnect electrical connections to circuit breaker. Remove two screws and four washers from circuit breaker. Remove circuit breaker, boot and bar.

(2) *Cleaning and inspection.*

(*a*) Clean with filtered compressed air or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect circuit breaker for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

d. 60 HZ Convenience Receptacle.

(1) *Removal.* Tag and disconnect electrical connections to receptacle. Remove four nuts, twelve washers, and four screws from receptacle cover. Remove receptacle cover, and capacitor. Remove two nuts, two washers and two screws from receptacle. Remove receptacle.

(2) *Cleaning and inspection.*

(*a*) Clean receptacle with filtered compressed air and electricians brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect receptacle for corrosion, cracks, damaged threads, internal receptacle damage or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

e. 60 HZ Power Output Receptacle (two used).

(1) *Removal.* Tag and disconnect electrical connections to receptacle. Remove four nuts, sixteen washers, and four screws from receptacle. Remove receptacle and gasket.

(2) *Cleaning and inspection.*

(*a*) Clean receptacle with filtered compressed air and electricians brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect receptacle for corrosion, cracks, internal insert damage or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

f. Water Line Heater Connector Plug (two used)

(1) *Removal.* Tag and disconnect electrical connections to receptacle. Unscrew receptacle cover. Remove four nuts, eight washers, and four screws from receptacle. Remove receptacle and gasket.

(2) *Cleaning and inspection.*

(*a*) Clean receptacle with filtered compressed air and electricians brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect receptacle for corrosion, cracks, damaged threads, internal insert damage or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

g. 400 HZ Convenience Receptacle Circuit Breaker.

(1) *Removal.* Tag and disconnect electrical connections to circuit breaker. Remove two screws and four washers from circuit breaker. Remove circuit breaker and boot.

(2) *Cleaning and inspection.*

(*a*) Clean circuit breaker with filtered compressed air or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect circuit breaker for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

h. Water Line Heater Circuit Breaker.

(1) *Removal.* Tag and disconnect electrical connections to circuit breaker. Remove two screws and four washers from circuit breaker. Remove circuit breaker and boot.

(2) *Cleaning and inspection.*

(*a*) Clean circuit breaker with filtered compressed air or wipe with a clean rag lightly moistened with an approved cleaning solution.

(*b*) Visually inspect circuit breaker for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

i. Fuel Heater Circuit Breaker.

(1) *Removal.* Tag and disconnect electrical connections from circuit breaker. Remove two screws and four washers from circuit breaker. Remove circuit breaker.

(2) *Cleaning and inspection.*

(*a*) Clean circuit breaker with filtered compressed air or wipe with a clean rag lightly moistened with an approved cleaning solution.

(*b*) Visually inspect circuit breaker for corrosion, cracks, damaged threads or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

j. Standby Operation Control Connector Plug.

(1) *Removal.* Tag and disconnect electrical connections to connector plug. Unscrew connector cover. Remove four nuts, sixteen washers and four screws from connector plug. Remove connector plug.

(2) *Cleaning and inspection.*

(*a*) Clean connector plug with filtered compressed air and electricians brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect connector plug for corrosion, cracks, damaged threads and inserts or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

k. 400 HZ Power Output Receptacles (Two used).

(1) *Removal.* Tag and disconnect electrical connections to receptacle. Remove four nuts, sixteen washers, and four screws. Remove receptacle and gasket.

(2) *Cleaning and inspection.*

(*a*) Clean receptacle with filtered compressed air and electricians brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect receptacle for corrosion, cracks, damaged threads and inserts or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

l. 400 HZ Convenience Receptacle.

(1) *Removal.* Tag and disconnect electrical connections to receptacle. Remove four nuts, twelve washers, and four screws from receptacle cover. Remove receptacle cover. Remove two nuts, two washers, and two screws from receptacle. Remove receptacle and capacitor.

(2) *Cleaning and inspection.*

(*a*) Clean receptacle with filtered compressed air and electricians brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect receptacle for corrosion, cracks, damaged inserts or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

m. 400 HZ Auxiliary Power Receptacles (two used).

Note. Access to the 400 Hz auxiliary power receptacles is by removal of the receptacle panel assembly (para 3-63).

(1) *Removal.* Tag and disconnect electrical connections to receptacle. Remove four nuts, sixteen washers and four screws from receptacle. Remove receptacle and gasket.

(2) *Cleaning and Inspection.*

(*a*) Clean receptacle with filtered compressed air and electricians brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect receptacle for corrosion, cracks, damaged inserts or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

n. Remote Fan Power Output Connector Plug (two used).

Note. Access to remote fan power output connector is by removal of the receptacle panel assembly (para 3-63).

(1) *Removal.* Unscrew connector cover from connector plug. Remove four nuts, sixteen washers, and four screws from connector plug. Push connector plug back through mounting bulkhead. Tag and disconnect electrical connections to connector plug. Remove connector plug.

(2) *Cleaning and inspection.*

(*a*) Clean connector plug with filtered compressed air, and electricians brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect connector plug for corrosion, cracks, damaged threads and inserts or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

o. Remote Fan Power Input Connector Plug.

Note. Access to remote fan power input connector plug is by removal of the receptacle panel assembly (para 3-63).

(1) *Removal.* Unscrew connector cover from connector plug. Remove four nuts, sixteen washers and four screws from connector plug. Push connector plug back through mounting bulkhead. Tag and disconnect electrical connections to connector plug. Remove connector plug.

(2) *Cleaning and inspection.*

(*a*) Clean connector plug with filtered compressed air and electricians brush or wipe with a clean rag lightly moistened with an approved cleaning solvent.

(*b*) Visually inspect connector plug for corrosion, cracks, damaged threads and inserts or other evidence of damage.

(3) *Installation.* Install in reverse order of removal procedures.

3-64. 400 Hz Generator (fig. 3-22)

Warning: **Electrical power to the gas turbine engine shall be disconnected before starting maintenance on generator.**

Note. Access to generator is obtained by removing the gas turbine engine power plant access door.

a. Removal.

(1) Release clamp on inlet air duct hose. Remove inlet air duct hose and clamp from inlet air cover.

(2) Release generator terminal cover from generator terminal board. Tag and disconnect generator electrical connections on terminal board. Tag and disconnect wiring harness connector from generator.

(3) Release clamp on generator exhaust chamber assembly hose. Remove exhaust chamber hose and clamp from exhaust chamber.

(4) Release clamp between generator and exhaust chamber assembly. Remove clamp from generator.

(5) Remove four screws and washers from upper half of exhaust chamber. Remove both sections of exhaust chamber.

Note. Note position of generator terminal board and inlet air cover to aid in positioning generator at installation.

(6) Loosen twelve mounting nuts on generator mounting flange. Rotate generator counterclockwise slightly to allow large opening of mounting holes on mounting flange to pass through mounting nuts. Remove generator from mounting flange.

Warning: **Have suitable hoisting or support equipment attached to generator as injury to personnel and equipment may result if hoisting is attempted without required equipment.**

b. Test.

(1) Start the power unit as described in paragraph 2-14. Operate the 400 Hz electrical system as described in paragraph 2-16*b*. With the 400 Hz electrical system operating, disconnect plug (P30) from voltage regulator (VR1). Using an adjustable potentiometer, apply 24v ac through a 50 watt resistor into pins J and E on plug (P30). Adjust potentiometer until voltage begins to increase on panel ac voltmeter (fig. 2-20). If main contactor trip indicator lamp illuminates, reset main contactor switch (fig. 2-20) and increase voltage to 120v ac line to neutral. If 120 volts are not obtainable 400 Hz generator has failed.

(2) With the power unit not operating, disconnect plug (P31) from the 400 Hz generator. Use a multimeter and check resistance across receptacle J31 pins AB, AC, and BC. Each check should indicate an equal resistance of 0.8 ohms. If resistance is otherwise, permanent magnet generator (PMG) has failed, and generator shall be replaced. Check resistance across pins D + and E- which shall be 5.0 ohms. Check resistance across pins E + and D- which shall be 4.0 ohms. If resistance is otherwise, exciter field has failed, and generator shall be replaced.

3-65. 60 Hz Generator (fig. 3-22)

Note. 400 Hz generator shall be removed to provide access to 60 Hz generator. Refer to paragraph 3-64 for 400 Hz generator removal procedures.

a. Removal.

(1) Release clamp on generator inlet air cover. Remove inlet air hose and clamp on inlet air cover.

(2) Release generator terminal cover from generator terminal board. Tag and disconnect generator electrical connections to generator terminal board. Tag and disconnect wiring harness connector from generator.

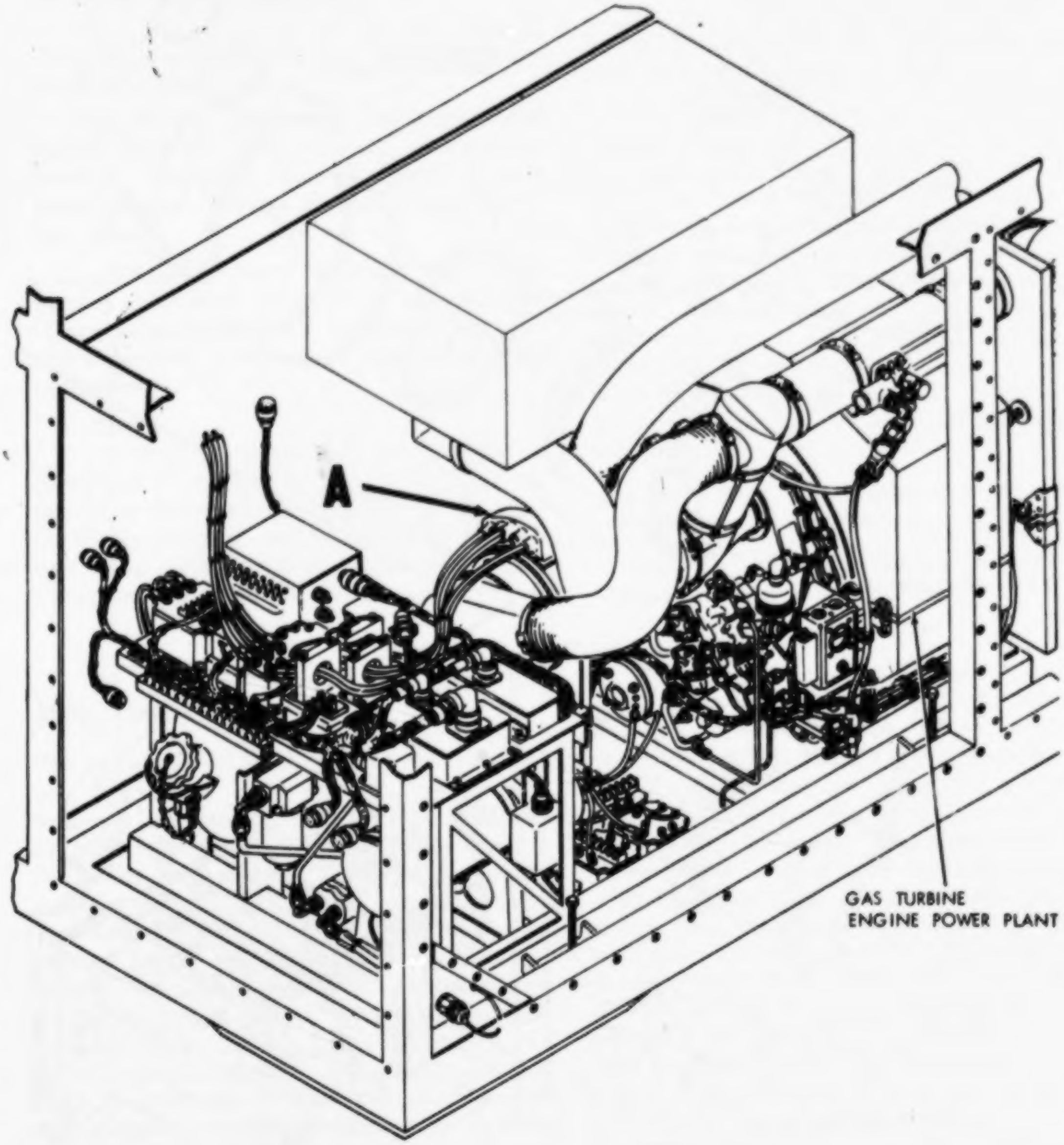

A
GAS TURBINE
ENGINE POWER PLANT
ME-5-6115-434-12/3-22 ①

Figure 3-22. Replacement of generators (Sheet 1 of 2).

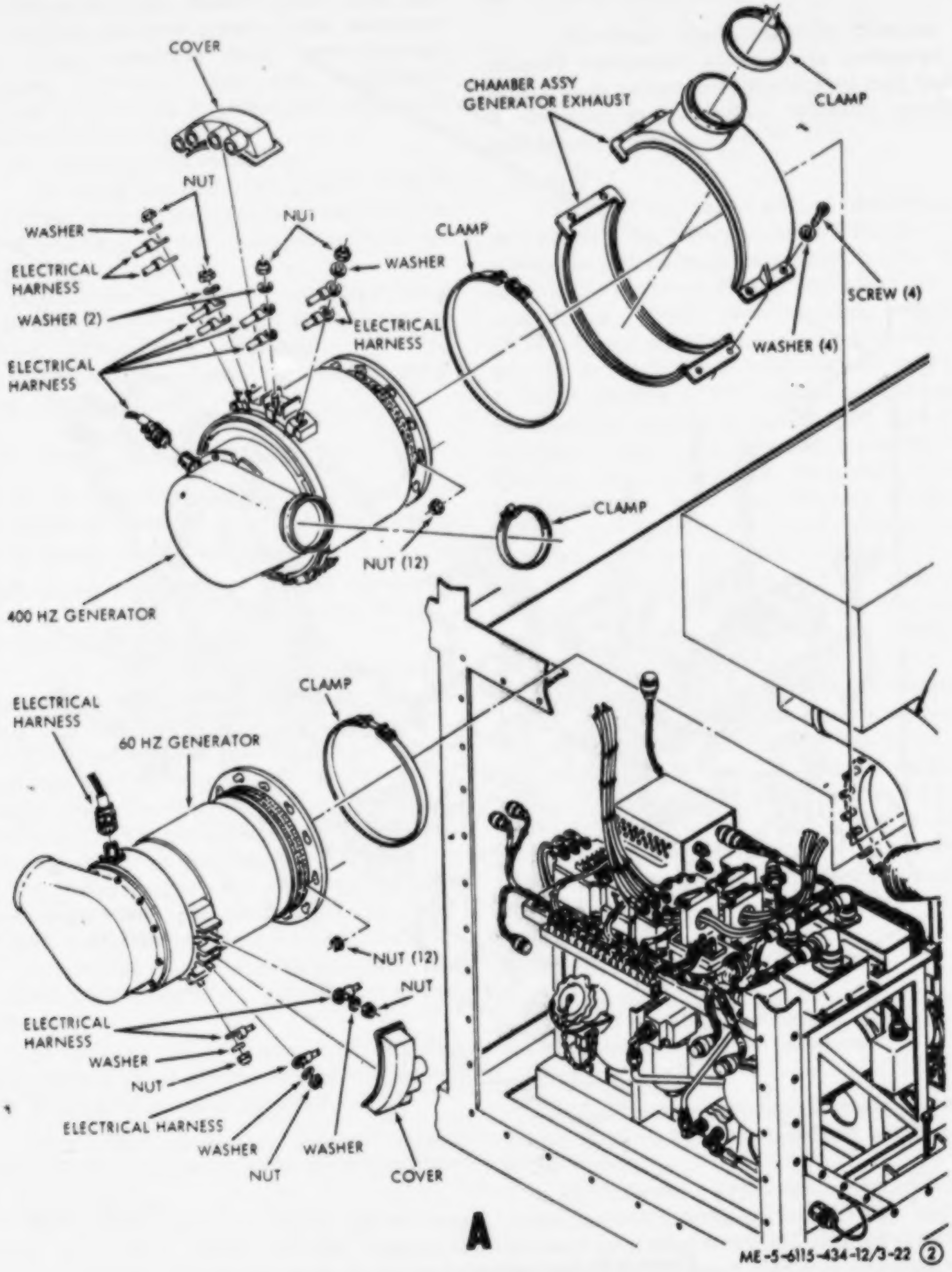

COVER
CHAMBER ASSY
GENERATOR EXHAUST
CLAMP
NUT
NUT
WASHER
CLAMP
WASHER
ELECTRICAL
HARNESS
SCREW (4)
WASHER (2)
ELECTRICAL
HARNESS
WASHER (4)
ELECTRICAL
HARNESS
CLAMP
NUT (12)
400 HZ GENERATOR
ELECTRICAL
HARNESS
CLAMP
60 HZ GENERATOR
NUT (12)
NUT
ELECTRICAL
HARNESS
WASHER
NUT
ELECTRICAL HARNESS
WASHER
WASHER
NUT
COVER
A
ME-5-6115-434-12/3-22 ②

Figure 3-22. Replacement of generators (Sheet 2 of 2).

(3) Release clamp on mounting flange of generator. Remove clamp on mounting flange of generator.

(4) Loosen twelve mounting nuts on mounting flange of generator.

Note. Note position of generator terminal board and inlet air cover to aid in positioning generator at installation.

(5) Rotate generator counterclockwise slightly to allow large opening of mounting holes on mounting flange to pass through mounting nuts. Remove generator from mounting flange.

Warning: **Have suitable hoisting or support equipment attached to generator as injury to personnel and equipment may result if hoisting is attempted without required equipment.**

b. Test.

(1) Start the power unit as described in paragraph 2-14. Operate the 60 Hz electrical system as described in paragraph 2-16*a*. With the 60 Hz electrical system operating, disconnect plug (P32) voltage regulator (VR2). Using an adjustable potentiometer, apply 24v ac through a 50 watt resistor into pins J and E on plug (P32). Adjust potentiometer until voltage begins to increase on panel ac voltmeter (fig. 2-19). If load contactor trip indicator lamp illuminates, reset load contactor switch (fig. 2-19) and increase voltage to 120v ac line to neutral. If 120 volts are not obtainable, 60 Hz generator has failed.

(2) With the power unit not operating, disconnect plug (P33) from the 60 Hz generator. Use a multimeter and check resistance across receptacle J33 pins AB, AC, and BC. Each check should indicate a resistance of 0.8 ohms. If resistance is otherwise, permanent magnet generator (PMG) has failed and generator shall be replaced. Check resistance across pins D+ and E− which shall be 5.0 ohms. Check resistance across pins E+ and D− which shall be .0 ohms. If resistance is otherwise, exciter field has failed and generator shall be replaced.

c. Installation. Install generator in reverse order of removal procedures.

Note. Use caution when meshing generator drive with gas turbine engine drive coupling.

Section XII. COOLED AIR SYSTEM

3-66. General

The cooled air system consists of two independent 10-ton vapor cycle refrigerating systems, system 1 and system 2. Each system is capable of being operated independently, or together for 20-ton total capacity. Each 10-ton system consists of a 120/208 volt, -wire, 3-phase, 400 Hz electric-motor driven centrifugal compressor with an integral overtemperature switch, an air cooled refrigerant condenser, two condenser cooling fans, a refrigerant receiver, an expansion valve, an evaporator, two recirculating air fans, a refrigeration solenoid valve, a compressor bypass solenoid valve, an overpressure switch, a refrigeration de-icing system, a filter-drier, a refrigerant level sight glass, and connecting tubing and fittings. The compressor compresses low-pressure, low-temperature refrigerant to high-pressure, high-temperature refrigerant gas. The overtemperature switch shuts off the compressor in the event of excessive temperature in the refrigerant loop. The overpressure switch shuts off the compressor in the event of excessive pressure in the refrigerant loop. The condenser fans produce a flow of cooling air across the refrigerant condenser. The refrigerant condenser removes heat from the high-pressure, high-temperature gas and converts the gas to a liquid. The refrigerant receiver collects the liquid from the condenser. The expansion valve converts liquid refrigerant from high-pressure to low-pressure. A portion of the liquid is evaporated in the expansion valve, producing a liquid gas combination. The evaporator recirculating fans provide a flow of air across the evaporator. The evaporator produces a further pressure drop in the liquid-gas refrigerant. Heat is transferred from the recirculated air to the area to be cooled. The normally open refrigeration valve shuts off flow of liquid refrigerant from the receiver to the expansion valve when the desired cooled air temperature is reached. The normally closed compressor bypass valve is actuated open by the refrigeration valve and reroutes a portion of the compressor discharge back on the compressor inlet. The refrigeration de-icing system prevents freeze-ups due to ice formation on the evaporator core. The filter-drier provides filtered and dried refrigerant to the compressor to cool the compressor motor and to lubricate the compressor bearings. The refrigerant level sight glass provides a means for determining sufficient refrigerant in the system.

Note. Access to the cooled air system is obtained by removing the condenser air inlet panels, refrigeration compressors compartment access door, and opening the return air inlet door.

Caution: DO NOT break refrigerant lines or fittings for any purpose. Refer all maintenance and service problems that require opening of refrigerant lines to direct support maintenance.

3-67. Recirculating Air and Fan Shroud Assembly (fig. 3-23)

a. Removal.

(1) Remove wiring harness connector from recirculating air fan. Remove three attaching bolts and washers from fan shroud assembly and remove fan from power unit.

(2) Remove 56 attaching bolts and washers from shroud assembly, separate from evaporator and remove from power unit.

b. Installation. Install replacement recirculating air fan and fan shroud assembly in reverse order of removal procedure. Reconnect wiring harness connector to fan.

3-68. Condenser Cooling Fan, Fan Mounting Plate and Shock Mount (Fig. 3-23)

a. Removal.

(1) Remove wiring harness connector from fan. Remove four attaching bolts, eight washers, and nuts. Remove fan and fan mounting plate from power unit.

(2) Remove four attaching bolts, eight washers, and four nuts from fan mounting plate and remove fan from mounting plate.

(3) Remove two attaching bolts, four washers, and two nuts from shock mount and remove shock mount from power unit.

b. Installation.

(1) Install replacement fan, mounting plate, and shock mount in reverse order of removal procedure.

(2) Connect wiring harness connector to fan.

Note. For the condensors to perform their functions at peak efficiency it may be necessary to remove dust, dirt, etc. from between the coil fins. Coil fins should be cleaned as required by flushing with water or air pressure. Flush or blow out in opposite direction of normal air flow. Care should be used so as not to damage coil surfaces.

Section XIII. HEATED AIR SYSTEM

3-69. General

The heated air system uses two independent control and mixing systems connected to a single source of heated air. Each system uses hot compressed air from the gas turbine engine through the bleed load control valve. Each system is capable of being operated independently, to provide one half of the total heat requirement, or together, to provide all the total heat requirement. Each heated air system consists of a common compressed air source, a common bleed load control valve, a common air pressure regulator, a common load control thermostat, a flow-control valve, an air mixing chamber, two recirculating fans and connecting ducting, tubing and fittings. Compressed, heated air is bled from the gas turbine engine turbine section through the bleed-air load control valve. The bleed load control valve remains closed at all times unless bleed air for heating is required, at which time the valve is opened to supply heated compressed air. The air pressure regulator supplies air to the load control valve to actuate the butter-fly valve. The load control thermostat modulates the load control valve to prevent operation of the engine at power levels that would result in excessive exhaust gas temperatures. The flow control valve permits the flow of hot bleed air from the load control valve to enter

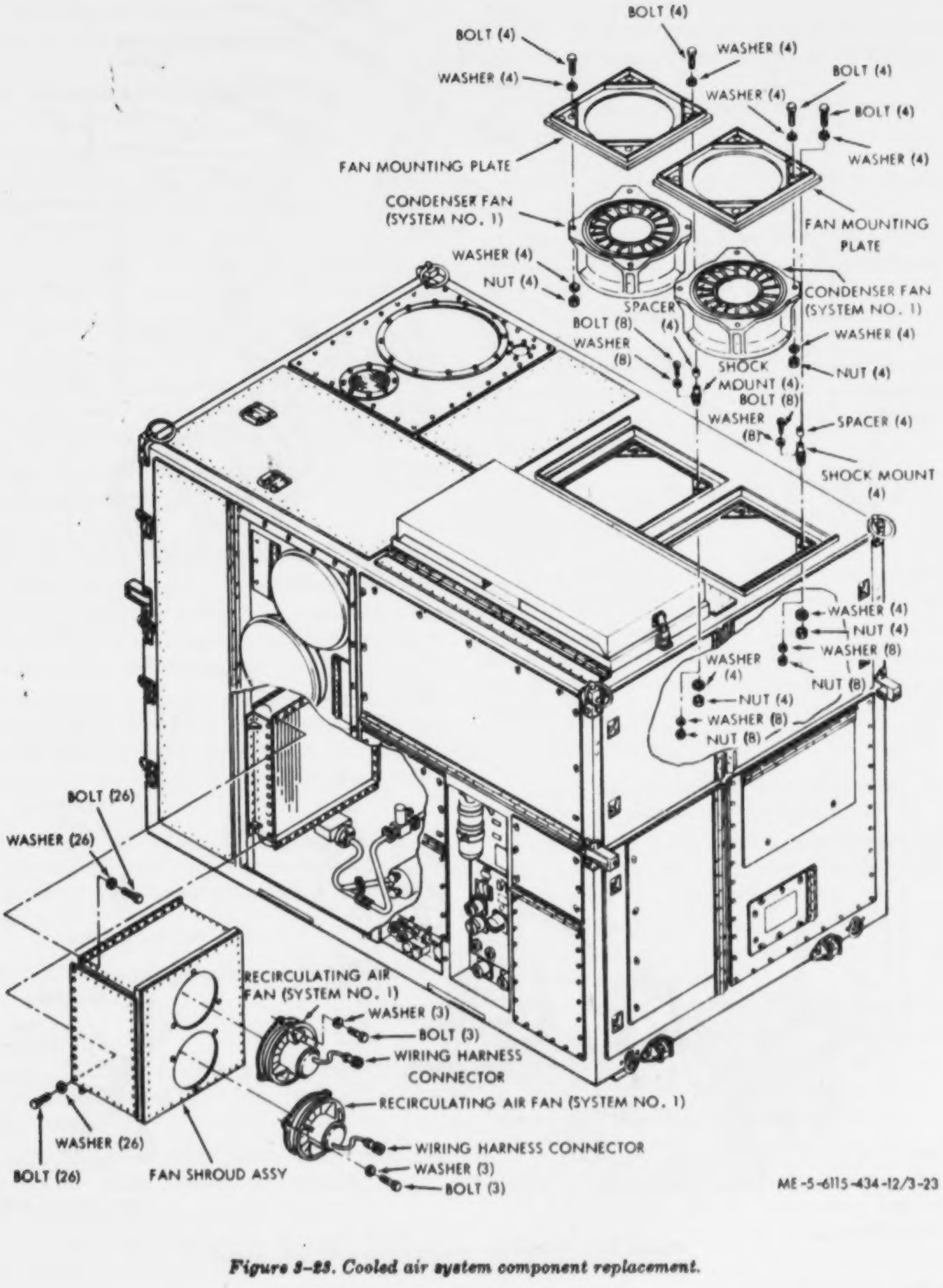

BOLT (4)
BOLT (4)
WASHER (4)
WASHER (4)
BOLT (4)
WASHER (4)
BOLT (4)
WASHER (4)
FAN MOUNTING PLATE
CONDENSER FAN (SYSTEM NO. 1)
FAN MOUNTING PLATE
WASHER (4)
NUT (4)
CONDENSER FAN (SYSTEM NO. 1)
SPACER (4)
BOLT (8)
WASHER (8)
WASHER (4)
SHOCK MOUNT (4)
NUT (4)
BOLT (8)
WASHER (8)
SPACER (4)
SHOCK MOUNT (4)
WASHER (4)
NUT (4)
WASHER (8)
NUT (8)
WASHER (4)
NUT (4)
WASHER (8)
NUT (8)
BOLT (26)
WASHER (26)
RECIRCULATING AIR FAN (SYSTEM NO. 1)
WASHER (3)
BOLT (3)
WIRING HARNESS CONNECTOR
RECIRCULATING AIR FAN (SYSTEM NO. 1)
WIRING HARNESS CONNECTOR
WASHER (3)
BOLT (3)
WASHER (26)
BOLT (26)
FAN SHROUD ASSY
ME-5-6115-434-12/3-23

Figure 3–23. Cooled air system component replacement.

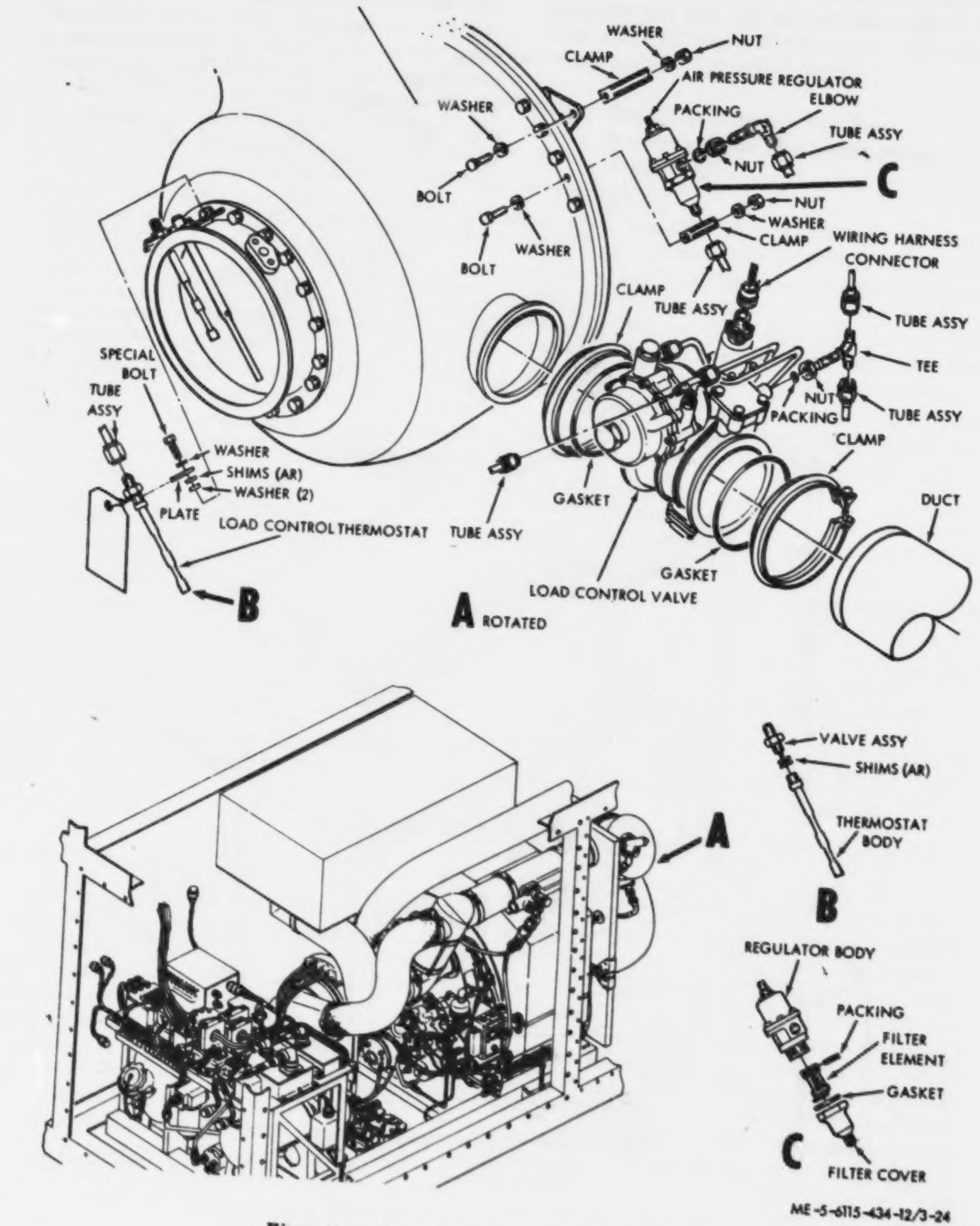

WASHER
NUT
CLAMP
AIR PRESSURE REGULATOR
ELBOW
PACKING
TUBE ASSY
WASHER
NUT
C
BOLT
NUT
WASHER
CLAMP
WASHER
BOLT
WIRING HARNESS CONNECTOR
CLAMP
TUBE ASSY
TUBE ASSY
TEE
SPECIAL BOLT
TUBE ASSY
NUT
PACKING
TUBE ASSY
WASHER
SHIMS (AR)
WASHER (2)
CLAMP
PLATE
DUCT
LOAD CONTROL THERMOSTAT
TUBE ASSY
GASKET
GASKET
LOAD CONTROL VALVE
B
A ROTATED
A
VALVE ASSY
SHIMS (AR)
THERMOSTAT BODY
B
REGULATOR BODY
PACKING
FILTER ELEMENT
GASKET
C
FILTER COVER
ME-5-6115-434-12/3-24

Figure 3-24. Heated air system component replacement.

the heat distribution manifold. The air mixing chamber mixes the hot bleed air from the engine with the air being forced through the ducting by the recirculating fans.

3-70. Bleed-Air Load-Control Valve (fig. 3-24)

a. Removal.

(1) Remove tube assemblies and wiring harness connectors from load-control valve.

(2) Remove clamp holding duct assembly to valve; remove clamp holding load-control valve to turbine plenum and remove load-control valve from power unit.

b. Installation.

(1) Install replacement load-control valve in reverse order of removal procedure using new gaskets and new clamps if required.

(2) Connect tube assemblies and wiring harness connectors to load-control valve.

3-71. Air Pressure Regulator (fig. 3-24)

a. Removal. Remove tube assemblies; remove two attaching bolts, four washers, two nuts, and two attaching clamps. Remove regulator from gas turbine engine.

b. Installation. Install replacement air pressure regulator on gas turbine engine in reverse order of removal procedure, using new clamps as required. Reconnect tube assemblies using new packing.

c. Adjustment. After replacement of regulator, check regulator output pressure and adjust, if required, in accordance with paragraph 3-8*e*(5).

3-72. Air Pressure Regulator Filter Element (fig. 3-24)

a. Removal.

(1) Without removing air pressure regulator, remove inlet air tube assembly from filter cover.

(2) Unscrew filter cover from regulator and remove filter element and packing.

b. Cleaning and inspection.

(1) If filter element is of spun wire design (coarse threads at base), clean using sonic cleaning method or by washing in an approved cleaning solvent and dry thoroughly with filtered compressed air.

(2) If filter element is of wire mesh design (no threads), clean using a paint stripping solution.

(3) Inspect filter element for any obvious damage.

c. Installation.

(1) Coat threads of regulator housing with compound.

(2) Install satisfactory or replacement filter element in reverse order of removal procedure using new packing, and gasket.

(3) Reconnect inlet air tube assembly to filter cover.

d. Adjustment. After replacement of filter element, check regulator output pressure and adjust, if required, in accordance with paragraph 3-8*e*(5).

3-73. Load Control Thermostat (fig. 3-24)

a. Removal.

(1) Hold flats on thermostat valve assembly with a wrench and remove tube assembly.

(2) Remove one attaching bolt and washer; remove plate and shim washer and remove load control thermostat from turbine plenum flange.

b. Installation.

(1) Coat threads of attaching bolt with thin film of compound (Fel-Pro C-5).

(2) Install replacement thermostat in turbine plenum flange, with side stamped "AFT" facing to rear or downstream.

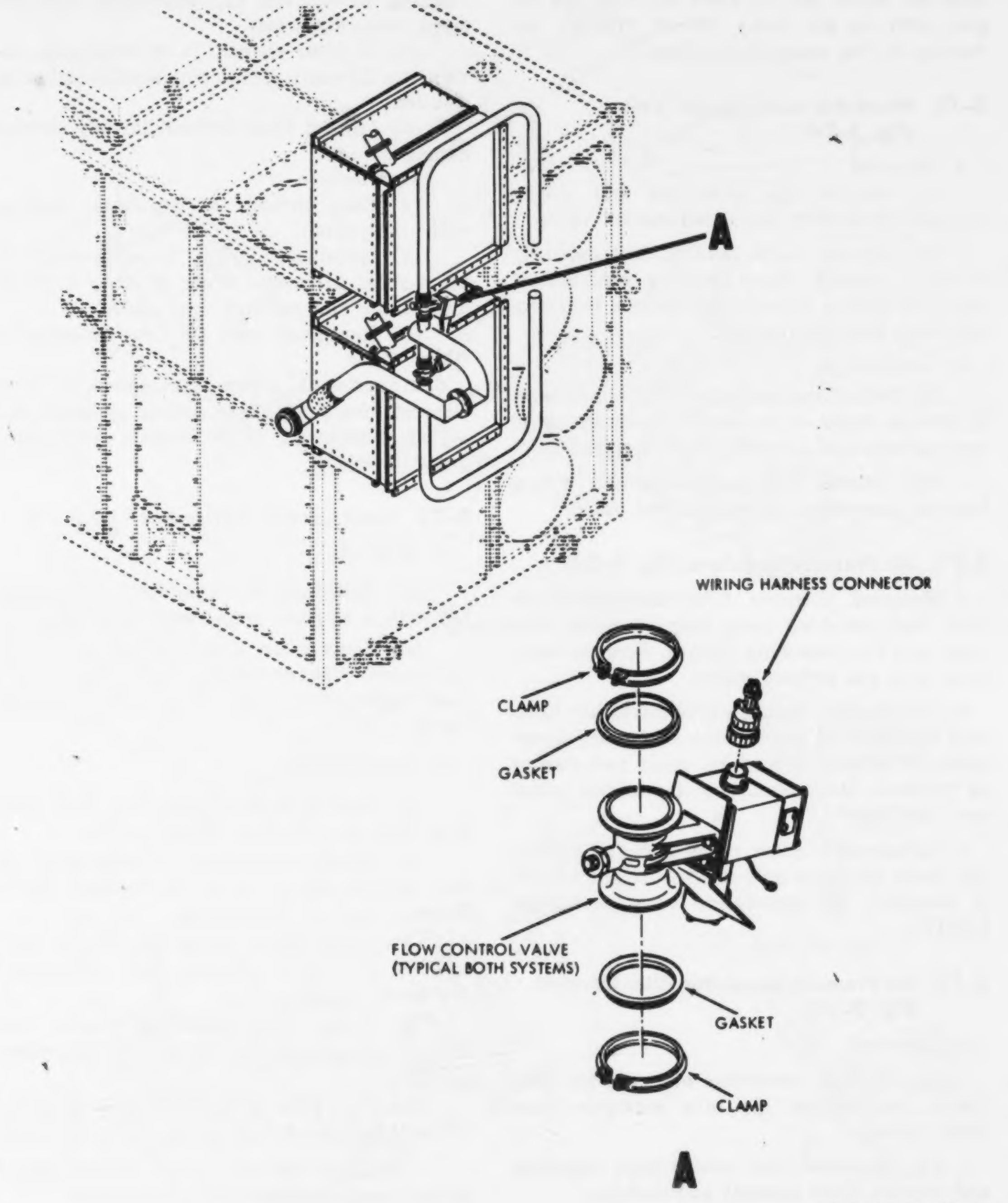
(3) Install shim washers to obtain 0.010 to 0.020 inch pinch between plate and mounting boss; install plate.

(4) Secure with attaching washer and bolt. Tighten bolt to 50 to 70 inch-pound torque.

(5) Hold flats on thermostat valve assembly with a wrench and connect tube assembly.

Caution: **Do not exceed 150 inch-pound torque when tightening tube assembly.**

c. Adjustment. Check controlling temperature and adjust, if required, in accordance with paragraph 3-8*e*(1).


A
WIRING HARNESS CONNECTOR
CLAMP
GASKET
FLOW CONTROL VALVE (TYPICAL BOTH SYSTEMS)
GASKET
CLAMP
A

ME-5-6115-434-12/3-25

Figure 3-25. Heated air system flow control valves replacement.

3-74. Flow Control Valve (fig. 3-25)

a. Removal. Remove wiring harness connector from flow control valve. Loosen clamps on each side of valve, remove clamps from flange and remove valve and gaskets.

b. Installation. Install replacement valve in place using new gaskets in reverse order of removal procedure. Reconnect wiring harness connector.

Section XIV. WATER SYSTEM

3-75. General

The water system consists of a hot water storage tank, surge tank, cold water pump, hot water pump, heat exchanger, and various pressure and temperature switches to control water pressure and temperature. Relief valves provide over pressure protection for the system.

3-76. Tube Assemblies and Plumbing Fittings (fig. 3-26)

Note. Drain water system prior to disconnecting any tube assemblies.

a. Removal. Remove tube assemblies and plumbing fittings as required for access to other components and to replace a damaged part.

Note. Tag or otherwise identify connection points, routing, orientation of fittings and location of supporting clamps for aid at assembly.

b. Cleaning and Inspection.

(1) Clean tube assemblies and plumbing fittings with an approved cleaning solvent and dry thoroughly with filtered compressed air.

(2) Visually inspect for cracks, corrosion, damaged threads or other obvious damage. Replace all damaged parts.

c. Installation. Install tube assemblies and plumbing fittings in reverse order of removal using new packings and gaskets as applicable.

3-77. Water System Components (fig. 3-26)

a. Removal. Remove water system components as required for replacement by disconnecting plumbing and electrical connections to the component as shown in the figure 3-26. Remove attaching hardware and remove the damaged component.

b. Installation. Install water system components in reverse order of removal procedure using figure 3-26 as a guide.

Note. Prime water system as described in paragraph 2-3b(5) after completion of parts replacement.

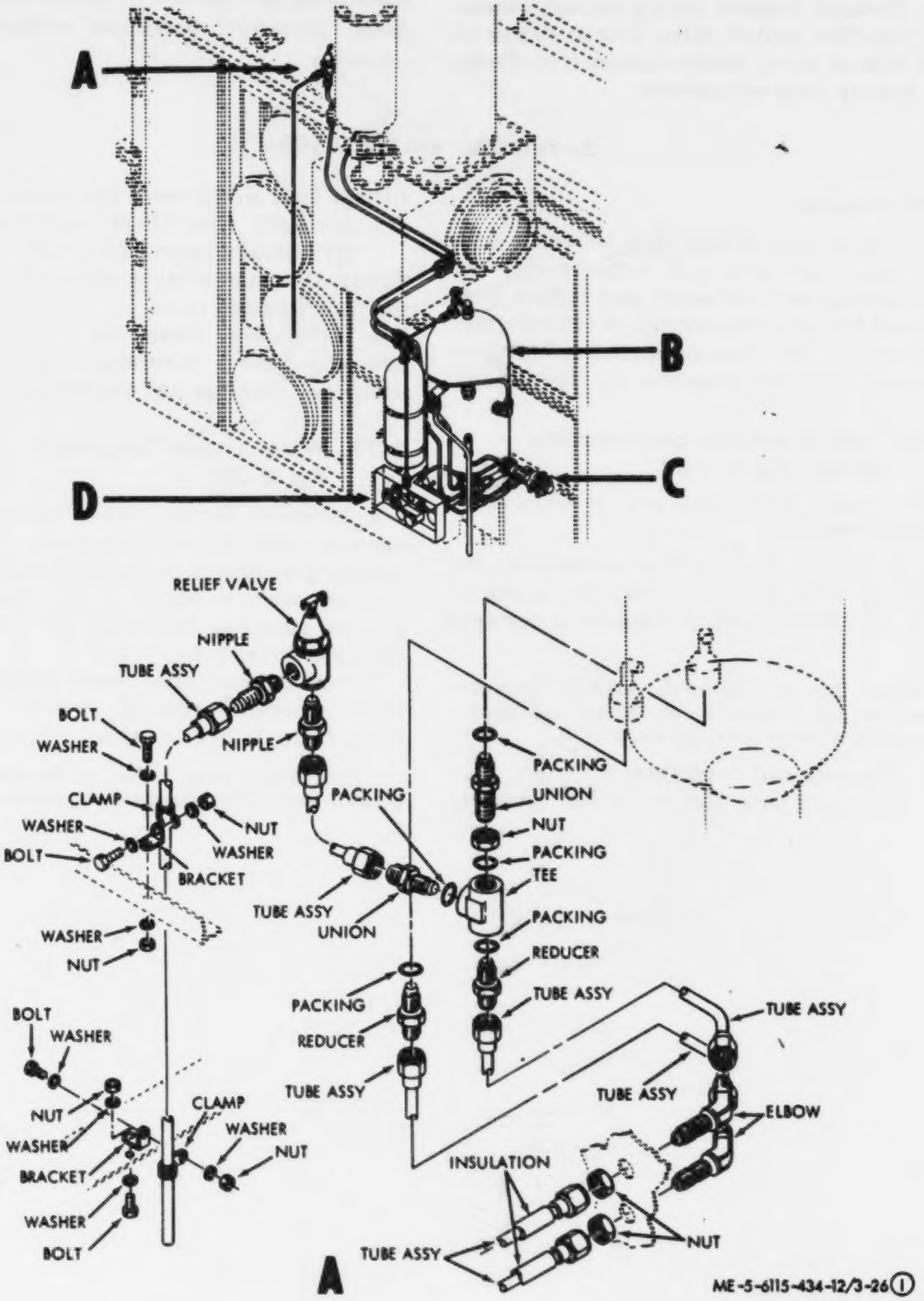

A
B
C
D
RELIEF VALVE
NIPPLE
TUBE ASSY
BOLT
WASHER
NIPPLE
CLAMP
WASHER
NUT
WASHER
BOLT
BRACKET
PACKING
UNION
NUT
PACKING
TEE
PACKING
TUBE ASSY
UNION
PACKING
REDUCER
TUBE ASSY
WASHER
NUT
PACKING
REDUCER
TUBE ASSY
TUBE ASSY
BOLT
WASHER
TUBE ASSY
NUT
CLAMP
ELBOW
WASHER
WASHER
BRACKET
NUT
INSULATION
WASHER
BOLT
NUT
TUBE ASSY
A
ME-5-6115-434-12/3-26①

Figure 3-26. Water system components replacement (Sheet 1 of 3).

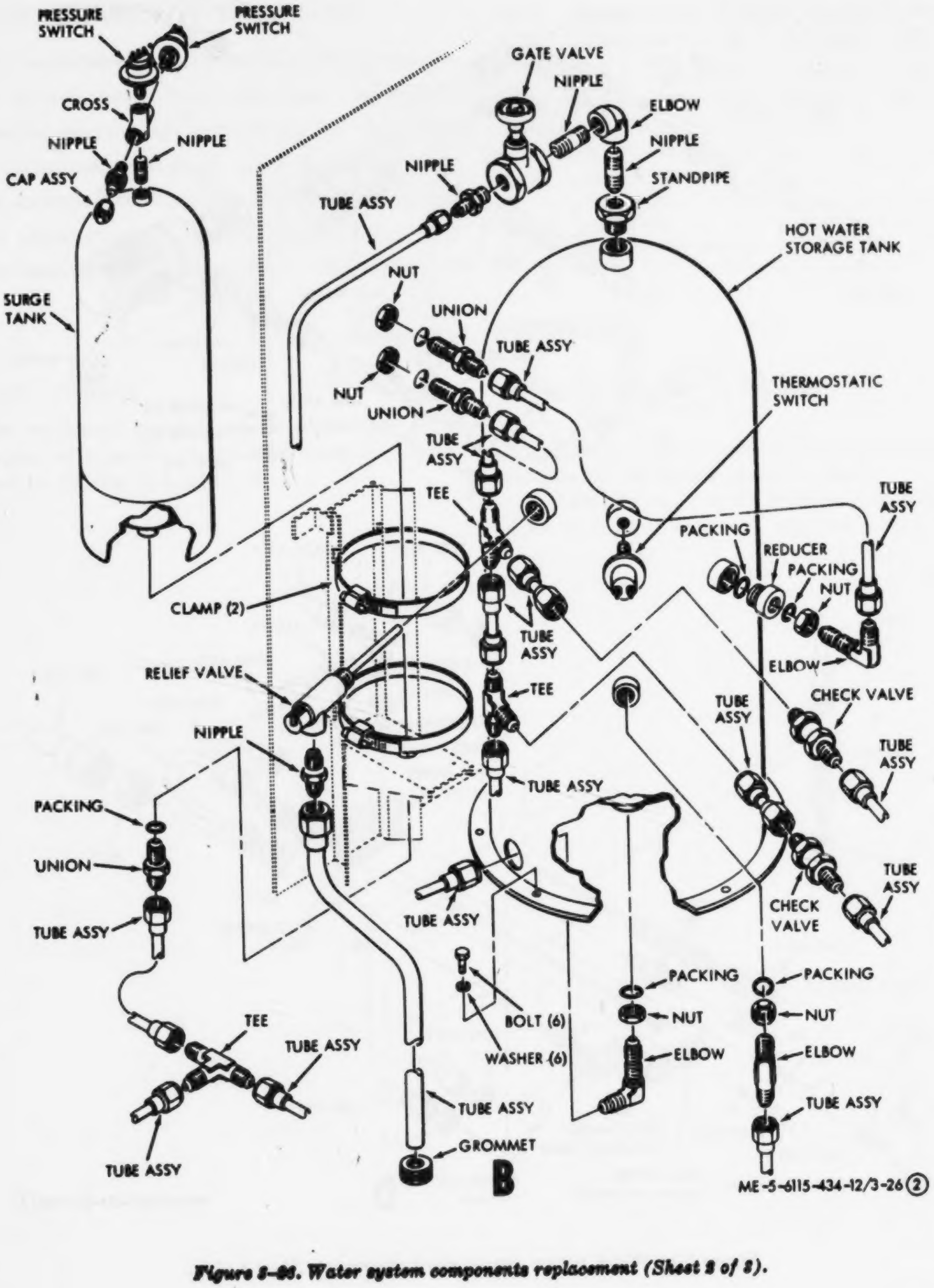

PRESSURE SWITCH
PRESSURE SWITCH
CROSS
NIPPLE
NIPPLE
CAP ASSY
SURGE TANK
GATE VALVE
NIPPLE
ELBOW
NIPPLE
NIPPLE
STANDPIPE
TUBE ASSY
HOT WATER STORAGE TANK
NUT
UNION
TUBE ASSY
NUT
UNION
TUBE ASSY
THERMOSTATIC SWITCH
TEE
TUBE ASSY
PACKING
REDUCER
PACKING
NUT
CLAMP (2)
TUBE ASSY
ELBOW
RELIEF VALVE
TEE
CHECK VALVE
TUBE ASSY
TUBE ASSY
NIPPLE
TUBE ASSY
PACKING
UNION
TUBE ASSY
TUBE ASSY
CHECK VALVE
TUBE ASSY
PACKING
PACKING
NUT
NUT
BOLT (6)
ELBOW
ELBOW
WASHER (6)
TEE
TUBE ASSY
TUBE ASSY
TUBE ASSY
TUBE ASSY
GROMMET
B
ME-5-6115-434-12/3-26 ②

Figure 3-26. Water system components replacement (Sheet 2 of 2).

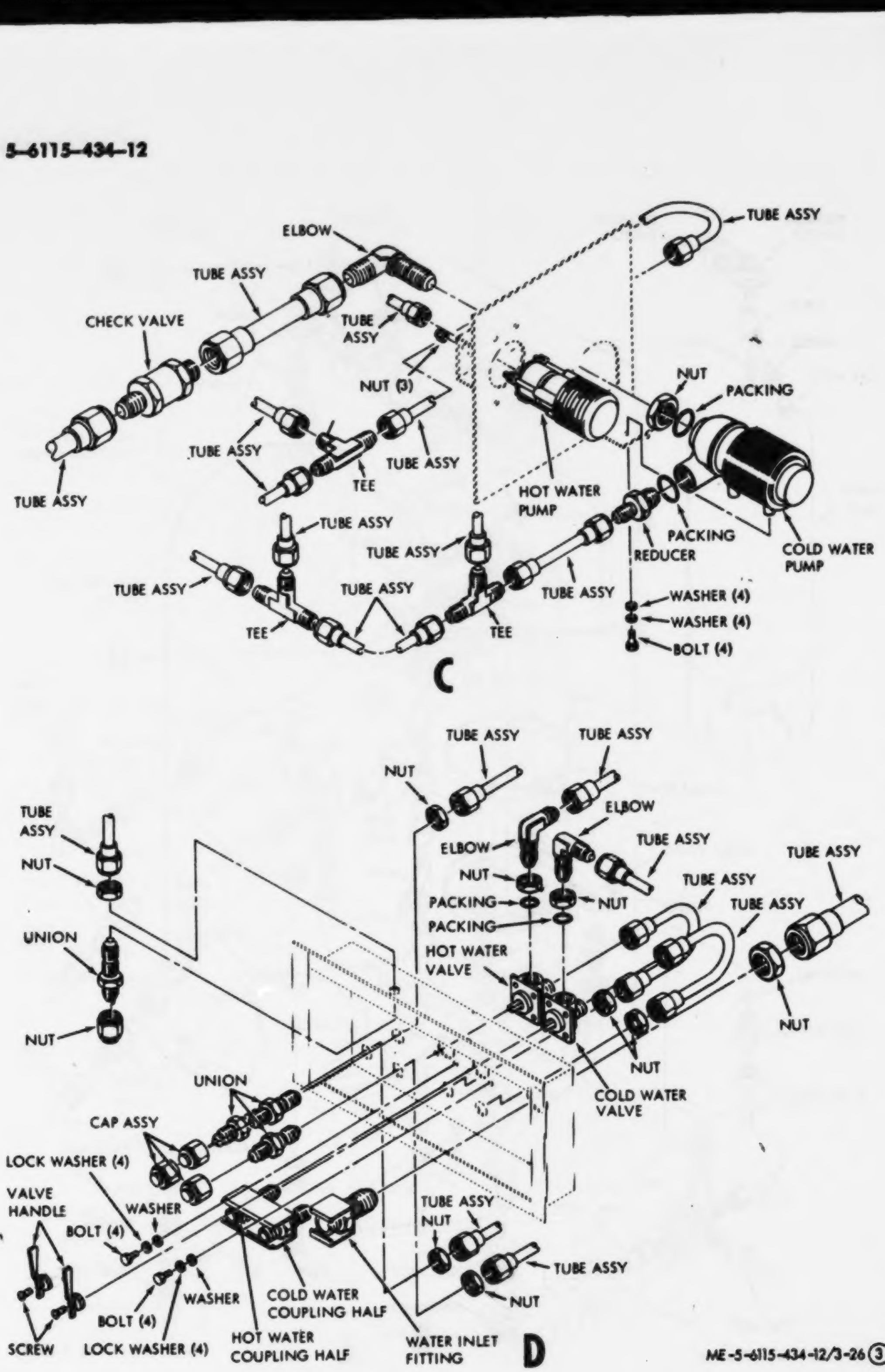

ELBOW
TUBE ASSY
TUBE ASSY
CHECK VALVE
TUBE ASSY
NUT (3)
TUBE ASSY
TEE
TUBE ASSY
TUBE ASSY
HOT WATER PUMP
NUT
PACKING
PACKING
REDUCER
COLD WATER PUMP
TUBE ASSY
TUBE ASSY
TUBE ASSY
TUBE ASSY
TEE
TEE
TUBE ASSY
WASHER (4)
WASHER (4)
BOLT (4)
C
TUBE ASSY
TUBE ASSY
NUT
ELBOW
TUBE ASSY
NUT
UNION
NUT
ELBOW
NUT
PACKING
PACKING
NUT
TUBE ASSY
TUBE ASSY
TUBE ASSY
TUBE ASSY
HOT WATER VALVE
NUT
NUT
COLD WATER VALVE
UNION
CAP ASSY
LOCK WASHER (4)
VALVE HANDLE
WASHER
BOLT (4)
TUBE ASSY
NUT
TUBE ASSY
NUT
BOLT (4)
WASHER
COLD WATER COUPLING HALF
SCREW
LOCK WASHER (4)
HOT WATER COUPLING HALF
WATER INLET FITTING
D
ME-5-6115-434-12/3-26 ③

Figure 3-26. Water system components replacement (Sheet 3 of 3).

Section XV. COMPRESSED AIR AND VACUUM SYSTEM

3-78. General (fig. 1-14 and 1-15)

The compressed air and vacuum system consists of control valves, tube and hose assemblies, vacuum eductor, and exhaust ducts. The system provides compressed air and vacuum suction for external applications and compressed air for scavenging the engine air inlet filter and for heating the water storage compartment.

3-79. Compressed Air and Vacuum System Components (fig. 1-14 and 1-15)

a. Removal. Disconnect plumbing connections to the component. Remove attaching hardware and remove component.

b. Installation. Install components in reverse order of removal procedures.

Note. The liberal use of hot bleed air to heat the various components will facilitate the ease of maintenance during cold weather operation, and expedite the evacuation of the refrigeration system.

Section XVI. ENCLOSURE

3-80. General

The enclosure consists of an aluminum allow frame with access panels and doors as identified on figures 1-1 and 1-2.

3-81. Access Panels and Doors (fig. 1-1 and 1-2)

a. Removal. Remove attaching hardware and remove the damaged panel or door.

b. Installation. Install replacement panel or door in reverse order of removal procedure.

CHAPTER 4

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

4-1. Preparation of Equipment for Shipment

a. General. Detailed instructions for the preparation of the power unit for domestic shipment are outlined within this paragraph. Preservation will be accomplished in sequence that will not require the operation of previously preserved components.

b. Inspection. The power unit will be inspected for any unusual conditions such as damage, rusting, accumulation of water and pilferage. Inspection of the individual components and assemblies will be as outlined on the "Preventive Maintenance Service Quarterly" in this manual.

c. Cleaning and Drying. All contamination shall be removed from the power unit by an approved method. Approved methods of cleaning and drying are described in TM 38-230.

d. Painting. Paint all surfaces where the paint has been removed or damaged. Refer to TM 9-213 for detail cleaning and painting instructions.

e. Depreservation Guide. Record depreservation instructions on DA Form 2258 (Preservation and Depreservation Guide for Vehicles and Equipment).

f. Lubrication System. Lubricate the item in accordance with the current lubrication order. Make sure that the crankcase is filled to the proper level. Operate the engine long enough to bring it up to its operating temperature and insure complete lubrication of bearings, gears, etc. Leave the oil in the crankcase.

g. Sealing of Openings. Openings that will permit the direct entry of water into the interior of the engine, electric motors, compressors, etc., shall be sealed with tape conforming to Specification PPP-T-60, Type IV.

h. Fuel Tank. Drain the fuel tank after engine preservation.

i. Exterior Surfaces. Coat exposed machined ferrous metal surfaces with Type P-6 preservative (CL) conforming to Specification MIL-C-11796 Class 3. If the preservative is not available, use Automotive and Artillery Grease (GAA) as specified in the lubrication order.

j. Batteries and Cables. Disconnect cables and secure to battery support or carrier with tape conforming to Specification PPP-T-60, Type IV.

k. Marking. Marking shall conform to MIL-STD-129.

4-2. Loading Equipment for Shipment

Use appropriate materials handling equipment of sufficient capacity to lift the power unit onto the carrier. Block and anchor the unit to the carrier to assure that it will not move during transit.

4-3. Preparation of Equipment for Storage

a. Detailed instructions for preparation of the power unit for limited storage are provided in paragraph 4-1. Refer to TB 740-90-1.

b. Every effort should be made to provide covered storage for the power unit. If this is impossible, select a firm, level, well drained storage location protected from prevailing winds. Position the power unit on heavy planking, cover with tarpaulin or other suitable water-proof material. Secure in a manner that will provide the power unit maximum protection from the elements.

4-4. Inspection and Maintenance of Equipment in Storage

When the item has been placed in limited storage, all scheduled preventive maintenance services, including inspection, shall be suspended and preventive maintenance inspection shall be performed as specified herein. Perform quarterly preventive maintenance services when the item is initially placed in limited storage and every 90 days thereafter. Record all deficiencies and shortcomings together with corrective action taken, on DA Form 2404. Required maintenance will be performed promptly to insure that the item is mechanically sound and ready for immediate use. At the time of quarterly inspection and maintenance, operate the item long enough to bring it up to operating temperature and insure complete lubrication of all bearings, gears, etc. After each operating period, represerve the item as outlined in paragraph 4-1.

Section II. DEMOLITION OF MATERIAL TO PREVENT ENEMY USE

4-5. General

When capture or abandonment of the power unit to the enemy is imminent, the responsible unit commander must make the decision to destroy the equipment or to render it in-operative. Based on this decision, orders are issued which cover the desired extent of destruction. Whatever method of demolition is employed, it is essential to destroy the same vital parts of all power units and all corresponding repair parts.

Caution: **Material will not be destroyed except upon order of proper authority.**

4-6. Demolition to Render the Power Unit Inoperative

a. Demolition by Misuse. Perform the following steps to render the unit inoperative:

(1) Remove oil filler cap (fig. 1-3) and screen.

(2) Pour water, sand, or dirt in oil tank and replace oil filler cap.

(3) Let the engine run until failure occurs.

b. Demolition by Mechanical Means. Use sledge hammers, crowbars, picks, axes, or other heavy tools which may be available, together with the tools normally included with the power unit to destroy the following:

(1) Fuel and oil filters, tanks, pumps and strainers.

(2) Starter, battery, upper rack assembly and lower rack assembly.

(3) Fuel atomizer assembly and combustion assembly.

(4) Accessory housing, compressor assembly and turbine assembly.

(5) Instrument panel, conditioned air system circuit breaker panel and electrical control components panel, electrical output connection panel, and remote power connection panel.

(6) Refrigeration compressors, condensers and condenser fans, evaporators and recirculating fans and refrigerant receivers.

4-7. Demolition by Explosives or Weapons' Fire

a. Demolition by Explosives. Place the required charges to destroy the power unit as shown in figure 4-1.

b. Demolition by Weapons' Fire. Fire on the power unit with the heaviest suitable weapons available.

4-8. Other Demolition Methods

a. Scattering and Concealment. Remove all easily accessible vital parts. Scatter them through dense foilage, bury them in dirt or sand, or throw them into a lake, stream, well, or other body of water.

b. Submersion. Totally submerge the power unit in a body of water to provide water damage and concealment. Salt water will do greater damage to metal parts than fresh water.

c. Burning. Pack rags, clothing, or canvas around and under the engine, the generators, in the engine air inlet compartment, in the refrigeration compartment, and around the refrigeration compressors. Saturate this packing with gasoline, oil, diesel fuel, or other available inflammable fluid and ignite.

4-9. Training

All operators should receive thorough training in the destruction of the power unit. Refer to FM 5-25. Simulated destruction, using all the methods listed above should be included in the operator training program. It must be emphasized in training that demolition operations are usually necessitated by critical situations when time available for carrying out destruction is limited. For this reason, it is necessary that all operators be thoroughly familiar with all methods of destruction of equipment and be able to carry out demolition instructions without reference to this or any other manual.

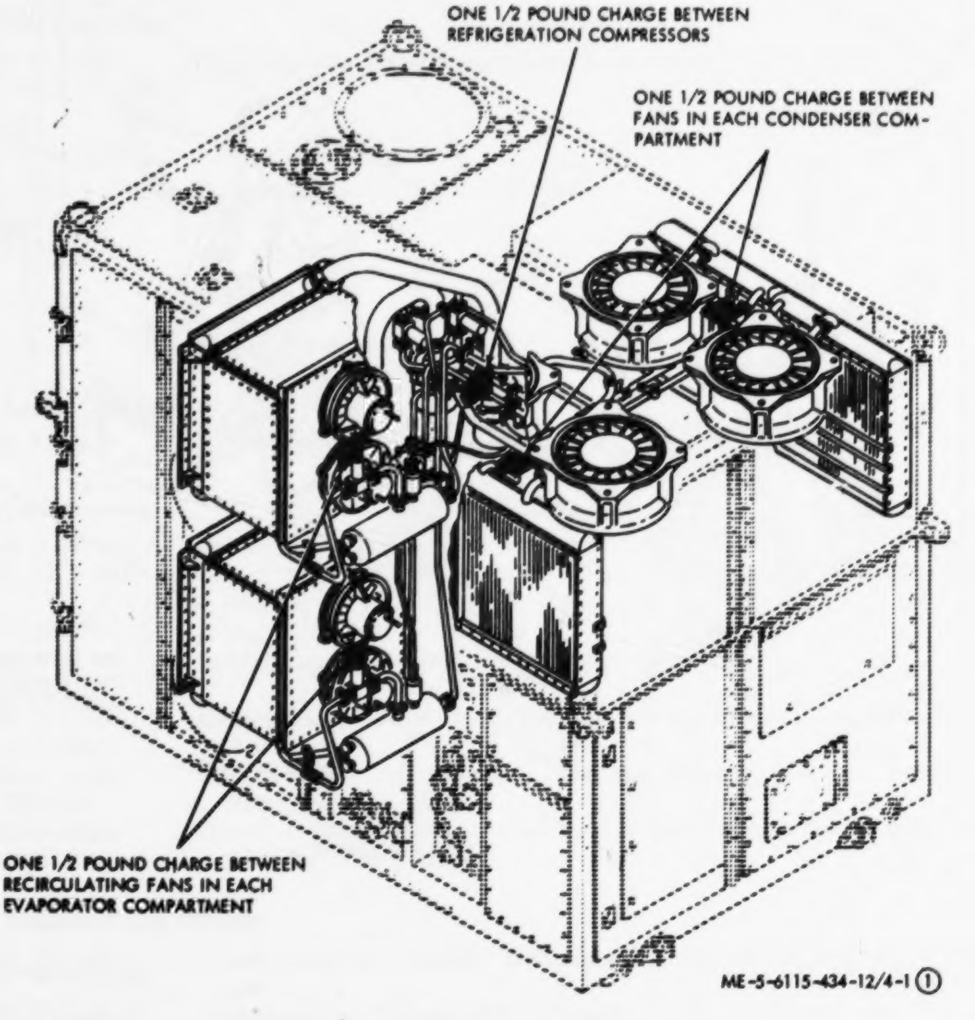

ONE 1/2 POUND CHARGE BETWEEN REFRIGERATION COMPRESSORS
ONE 1/2 POUND CHARGE BETWEEN FANS IN EACH CONDENSER COMPARTMENT
ONE 1/2 POUND CHARGE BETWEEN RECIRCULATING FANS IN EACH EVAPORATOR COMPARTMENT
ME-5-6115-434-12/4-1 ①

Figure 4-1. Placement of charges (Sheet 1 of 2).

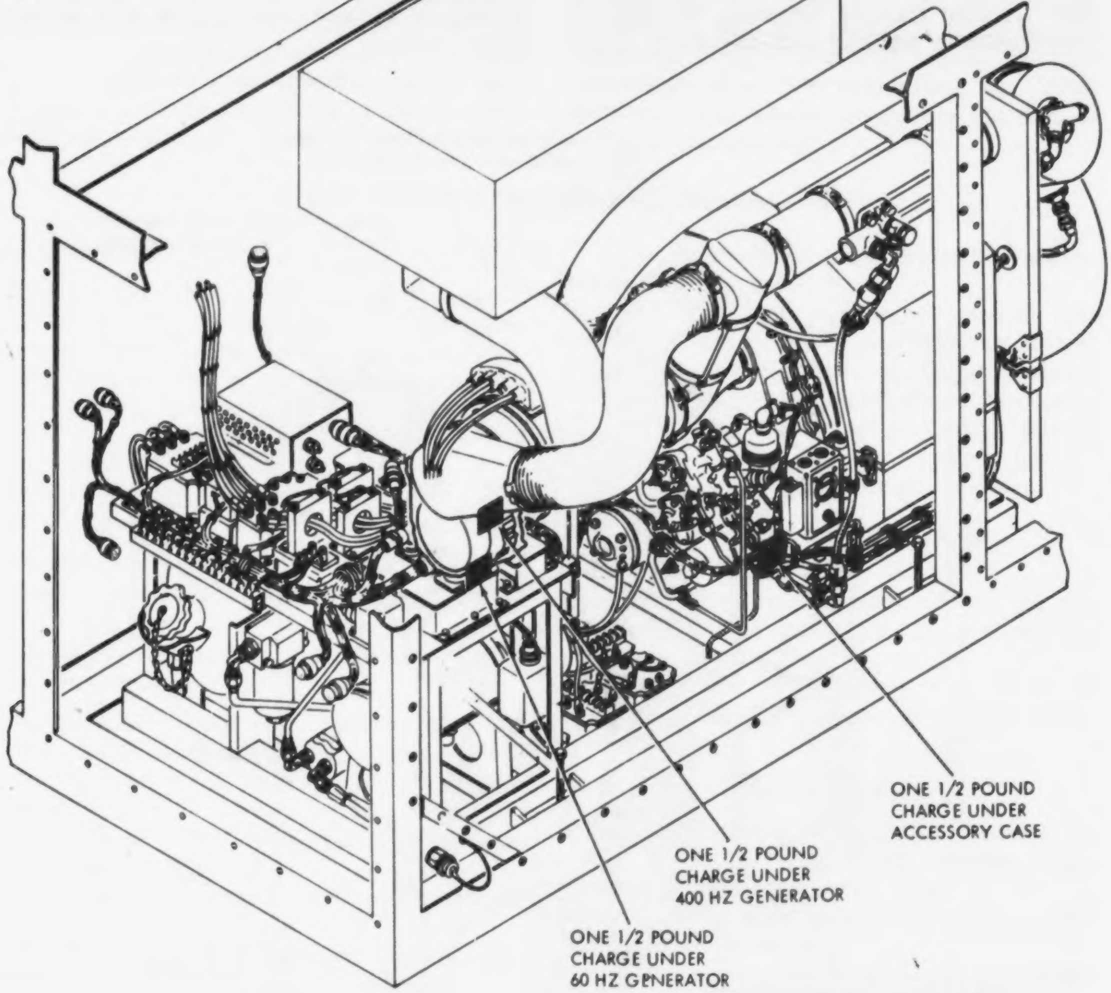

ONE 1/2 POUND
CHARGE UNDER
ACCESSORY CASE
ONE 1/2 POUND
CHARGE UNDER
400 HZ GENERATOR
ONE 1/2 POUND
CHARGE UNDER
60 HZ GENERATOR
ME-5-6115-434-12/4-1 ②

Figure 4-1. Placement of charges (Sheet 2 of 2).

APPENDIX A

REFERENCES

A–1. Fire Protection

TB 5–4200–200–10	Hand Portable Fire Extinguishers Approved for Army Users

A–2. Lubrication

C9100IL	Fuels, Lubricants, Oils and Waxes
LO 5–6115–434–12	Lubrication Order.

A–3. Painting

TM 9–213	Painting Instructions for Field Use

A–4. Radio Suppression

TM 11–483	Radio Interference Suppression

A–5. Maintenance

TM 9–1870–1	Care and Maintenance of Pneumatic Tires
TB ORD 651	Use of Antifreeze Solutions and Cleaning Compounds in Engine Cooling Systems
TM 38–750	Army Equipment Procedures
TM 5–6115–434–12	Operator and Organization Maintenance Manual
TM 5–6115–434–20P	Organizational Maintenance Repair Parts and Special Tools List
TM 9–6140–200–15	Operation and Organizational Field and Depot Maintenance Storage Batteries, Lead Acid Type
TM 5–4920–200–15	Operator, Organizational, Field and Depot Maintenance Manual, Engine Analyzer, Gas Turbine

A–6. Shipment and Storage

TB 740–93–2	Preservation of USAMEC Mechanical Equipment for Shipment and Storage
TM 740–90–1	Administrative Storage of Equipment
TM 38–230	Preservation, Packaging, and Packing of Military Supplies and Equipment

APPENDIX B

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

B-1. Scope

This appendix lists items which accompany the power unit or are required for installation, operation, or operator's maintenance.

B-2. General

This Basic Issue Items List is divided into the following sections:

a. Basic Issue Items—Section II. A list of items which accompany the power unit or are required for the installation, operation, or operator's maintenance.

b. Maintenance and Operating Supplies—Section III. A listing of maintenance and operating supplies required for initial operation.

B-3. Explanation of Columns

The following provides an explanation of columns in the tabular list of basic issue items, section II.

a. Source, Maintenance, and Recoverability Code (SMR), Column (1):

Note. Common hardware items known to be readily available in Army supply will be assigned Maintenance Codes only. Source Codes, Recoverability Codes, and Quantity Authorized will not be assigned to this category of items.

(1) *Source code, column (1).* Indicates the selection status and source for the listed item. Source codes are:

Code	Explanation
P	Applied to repair parts which are stocked in or supplied from GSA/DSA or Army supply system, and authorized for use at indicated maintenance categories.
M	Applied to repair parts which are not procured or stocked but are to be manufactured at indicated maintenance categories.
A	Applied to assemblies which are not procured or stocked as such, but made up of two or more units, each of which carry individual stock numbers and descriptions and are procured and stocked and can be assembled by units at indicated maintenance categories.
X	Applied to parts and assemblies which are not procured or stocked, the mortality of which is normally below that of the applicable end item, and the failure of which should result in retirement of the end item from the supply system.
X1	Applied to repair parts which are not procured or stocked, the requirement for which will be supplied by use of the next higher assembly or components.
X2	Applied to repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain them through cannibalization; if not obtainable through cannibalization, such repair parts will be requisitioned with supporting justification through normal supply channels.
C	Applied to repair parts authorized for local procurements. If not obtainable from local procurement, such repair parts will be requisitioned through normal supply channels with a supporting statement of nonavailability from local procurement.
G	Applied to major assemblies that are procured with PEMA (Procurement Equipment Missile Army) funds for initial issue only to be used as exchange assemblies at DSU and GSU level or returned to depot supply level.

(2) *Maintenance code, column (1).* Indicates the lowest category of maintenance

authorized to install the listed item. The maintenance level code is:

Code	Explanation
C	Operator/crew
O	Organizational maintenance

(3) *Recoverability code, column (1).* Indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are expendable. Recoverability codes are:

Code	Explanation
R	Applied to repair parts and assemblies which are economically repairable at DSU and GSU activities and are normally furnished by supply on an exchange basis.
T	Applied to high dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts are normally repaired or overhauled at depot maintenance activities.
U	Applied to repair parts specifically selected for salvage by reclamation units because of precious metal content, critical materials, high dollar value reusable casings and castings.

b. *Federal Stock Number, Column (2).* This column indicates the Federal stock number for the item.

c. *Description, Column (3).* This column indicates the Federal item name and any additional description of the item required. A part number or other reference number is preceded by the applicable five-digit Federal supply code for manufacturers in parentheses. Repair parts quantities included in kits, sets, and assemblies are shown in front of the repair part name.

d. *Unit of Issue, Column (4).* This column indicates the unit used as a basis for issue, e.g., ea, pr, ft, yd, etc.

e. *Quantity Incorporated in Unit Pack, Column, (5).* This column indicates the actual quantity contained in the unit pack.

f. *Quantity Incorporated in Unit, Column (6).* This column indicates the quantity of the item used in the functional group.

g. *Quantity Furnished with Equipment, Column (7).* This column indicates the quantity of an item furnished with the equipment.

h. *Quantity Authorized, Column (8).* This column indicates the quantity of an item authorized the operator/crew to have on hand or to obtain as required. As required items are indicated with an asterisk.

i. *Illustration, Column (9).* This column is divided as follows:

(1) *Figure Number, column (9)(a).* Indicates the figure number of the illustration in which the item is shown.

(2) *Item Number, column (9)(b).* Indicates the callout number used to reference the item in the illustration.

B-4. Explanation of Columns in the Tabular List of Maintenance and Operating Supplies—Section III

a. *Item, Column (1).* This column contains numerical sequenced item numbers, assigned to each component application, to facilitate reference.

b. *Component Application, Column (2).* This column identifies the component application of each maintenance or operating supply item.

c. *Federal Stock Number, Column (3).* This column indicates the Federal stock number for the item and will be used for requisitioning purposes.

d. *Description, Column (4).* This column indicates the item and brief description.

e. *Quantity Required for Initial Operation, Column (5).* This column indicates the quantity of each maintenance or operating supply item required for initial operation of the equipment.

f. *Quantity Required for 8 Hours Operation, Column (6).* This column indicates the estimated quantities required for an average eight hours of operation.

g. *Notes, Column (7).* This column indicates informative notes keyed to data appearing in a preceding column.

B-5. Special Information

"Not Applicable"

B-6. Abbreviations

V	volts
ah	ampere-hour
dc	direct current
assy	assembly
in.	inch
ft	feet
phr	pound per hour
max	maximum

B-7. Federal Supply Code for Manufacturers

Code	Manufacturer
96906	Military Standard Promulgated by Standardization DIV Directorate of Logistic Services DSA, Washington, D. C.
99193	AiResearch MFG CO of Arizona, Phoenix, Arizona

Section II. BASIC ISSUE ITEMS LIST

(1) Source, maint and recov code.			(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9) Illustration	
(A) S	(B) M	(C) R	Federal Stock No.	Description	Unit of Issue	Qty inc in unit pack	Qty inc in unit	Qty furn with equip	Qty auth	(A) Fig No.	(B) Item No.
				Group 31—Basic Issue Items manufacturer installed 3100—Basic Issue Items manufacturer or Depot installed							
P	O		6140-057-2553	Battery storage 12V, Lead Acid 45 AH				2	2		
P	O		7510-889-3494	Binder Loose Leaf: U. S. Army Equipment Log Book *Note.* Initial issue and replenishment will be made in accordance with TM 38-750				1	1		
P	O		7520-559-9618	Case: Maintenance and Operational Manuals, cotten duck, water repellent, mildew resistant MIL-B-11743				1	1		
				Department of the Army Lubrication Order LO 5-6115-434-12				•	1		
				Department of the Army Operator and Organizational Maintenance Manual TM 5-6115-434-12				•	2		
				Department of the Army Organizational Maintenance Repair Parts and Special Tools List TM 5-6115-434-20P				•	2		
P	O		6115-843-8612	Cable Assy Power Electrical DC (99193) 694214-1				1	1		
P	O		6115-859-2352	Cable Assy Power Electrical DC (99193) 694215-1				1	1		
P	O		2835-843-7750	Hose Bleed Air (99193) 697943-2				1	1		
P	O		4130-863-8636	Duct Assy, Air (99193) 697941-4				8	8		
P	O		2835-859-3132	Ejector Assy (99193) 694472-1				1	1		
P	O		6115-859-2346	Cable Assy, Remote Power 400 Cycle (99193) 697017-1				1	1		
P	O		5410-863-8594	Cable Assy, Power 60 Cycle (99193) 697124-1				1	1		
P	O		5410-863-8595	Cable Assy, Power 400 Cycle (99193) 697125-1				1	1		
P	O		4130-863-8986	Cable Assy, Remote Sensing (99193) 698597-1				1	1		

(1) Source, maint and recvr code.			(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9) Illustration	
(A) S	(B) M	(C) R	Federal Stock No.	Description	Unit of issue	Qty inc in unit pack	Qty inc in unit	Qty furn with equip	Qty auth	(A) Fig No.	(B) Item No.
P	O		6115-079-8535	Hose Assy, Dual, Water (99193) 889140-4				1	1		
P	O		4720-803-8450	Hose Assy, Water Supply (99193) 697193-6				1	1		
P	O		6115-871-6709	Cable, Power, DC, Stand-by (99193) 694216-1				1	1		
P	O		2835-854-4799	Filter Assy Fuel (99193) 889709-1				1	1		
				Group 32—Basic Issue Items, Troop installed 3200—Basic Issue Items, Troop installed or authorized							
P	O		5975-878-3791	Rod, Ground: 5/8 in diameter 9 ft long Cone Point, 3 Sections				*	1		
				Warning: **Operator working in the area of equipment producing frequency noises especially if such equipment is operating in a confined area, will be required to wear ear plugs, supplemented by ear protectors. See your safety or medical officer for examination requirements and federal stock number for ear plugs and ear protectors.**							
P	O			Plug, ear (as specified by safety or medical officer)				*	1		
P	O		4240-861-3612	Protector, AURAL				*	1		
P	O		4210-012-2507	Extinguisher, Fire							

Section III. MAINTENANCE AND OPERATING SUPPLIES

(1) Item	(2) Component application	(3) Federal stock number	(4) Description	(5) Quantity required f/initial operation	(6) Quantity required f/8 hrs operation	(7) Notes
1	Fuel Tank		TURBINE FUEL: 55 gal drum as follows:			(1) JP-4, JP-5 is the preferred fuel, for continuous operation. A large supply source is required.
		9130-256-8617 (2)	JP-4 MIL-J-5264	55 gal (1)	248 gal	
		9130-256-1294 (2)	JP-5 MIL-J-5264	55 gal (1)	248 gal	
			FUEL, GASOLINE: 55 gal drum as follows:			(2) See C9100-IL for additional data and requisitioning procedure.
		9130-221-0680 (2)	91A MIL-G-3056	55 gal	(3)	(3) To be used as emergency fuel for limited operation only.
			FUEL, GASOLINE, AVIATION: 55 gal drum as follows:			
		9130-221-0684. (2)	Grade 80/87 MIL-G-5572	55 gal	(3)	(4) Oil consumption is 0.25 qt. per hour max.
		9130-221-0674 (2)	Grade 91/96 MIL-G-5572	55 gal	(3)	
		9130-221-0677 (2)	Grade 100/130 MIL-G-5572	55 Gal	(3)	
		9130-273-2375 (2)	Grade 115/145 MIL-G-5572	55 gal	(3)	
2	Lubricating System		OIL, LUBRICATING, TURBINE ENGINE: 1 qt can as follows.			
		9150-270-0056	LGT MIL-L-7808	10 qts	1 qt (4)	

APPENDIX C

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

C-1. General

a. Section I provides a general explanation of all maintenance and repair functions authorized at various maintenance levels. It also provides an explanation of the contents of sections II, III, and IV.

b. Section II designates overall responsibility for the performance of maintenance functions on the identified end item or components. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III lists the special tools and test equipment required for each maintenance function as referenced from section II.

d. Section IV contains supplemental instructions, explanatory notes, and/or illustrations required for a particular maintenance function.

C-2. Explanation of Columns in Section II (Maintenance Allocation Chart)

a. Group Number, Column (1). The functional group is a numerical group set up on a functional basis. The applicable functional grouping indexes (obtained from TB 750-93-1, Functional Grouping Codes) are listed on the MAC in the appropriate numerical sequence. These indexes are normally set up in accordance with their function and proximity to each other.

b. Functional Group, Column (2). This column contains a brief description of the components of each functional group.

c. Maintenance Functions Column (3). This column lists the various maintenance functions (A through K) and indicates the lowest maintenance category authorized to perform these functions. The symbol designations for the various maintenance categories are as follows:

O—Organizational maintenance
F—Direct support maintenance
H—General support maintenance
D—Depot maintenance

The maintenance functions are defined as follows:

A—Inspect: To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.

B—Test: To verify serviceability and to detect electrical or mechanical failure by use of test equipment.

C—Service: To clean, to preserve, to charge, to paint, and to add fuel, lubricants, cooling agents, and air.

D—Adjust: To rectify to the extent necessary to bring into proper operating range.

E—Aline: To adjust specified variable elements of an item to bring to optimum performance.

F—Calibrate: To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust and discrepancy in the accuracy of the instrument being compared with the certified standard.

G—Install: To set up for use in an operational environment such as an emplacement, site, or vehicle.

H—Replace: To replace unserviceable items with serviceable assemblies, subassemblies, or parts.

I—Repair: To restore an item to serviceable condition. This includes, but is not limited to, inspection, cleaning, preserving, adjusting, replacing, welding, riveting, and strengthening.

J—Overhaul: To restore an item to a completely serviceable condition as prescribed by maintenance serviceability standards using the Inspect and Repair Only as Necessary (IROAN) technique.

K—Rebuild: To restore an item to a standard as nearly as possible to original or new condition in appearance, performance, and life expectancy. This is accomplished through complete disassembly of the item, inspection of all parts or components, repair or replacement of worn or unserviceable elements (items) using original manufacturing tolerances and specification, and subsequent reassembly of the item.

d. Tools and Equipment Column (4). This column is provided for referencing by code the special tools and test equipment (sec. III) required to perform the maintenance functions (sec. II).

e. Remarks Column (5). This column is provided for referencing by code the remarks (sec. IV) pertinent to the maintenance functions.

C-3. Explanation of Columns in Section III (Special Tool and Test Equipment Requirements)

a. Reference Code. This column consists of a number and a letter separated by a dash. The number references the T and TE requirements column on the MAC (Maintenance Allocation Chart). The letter represents the specific maintenance function the item is to be used with. The letter is representative of Columns A through K on the MAC.

b. Maintenance Category. This column shows the lowest level of maintenance authorized to use the special tool or test equipment.

c. Nomenclature. This column lists the name or identification of the tool or test equipment.

d. Tool Number. This column lists the manufacturer's code and part number, or Federal Stock Number, of tools and test equipment.

C-4. Explanation of Columns in Section IV (Remarks)

a. Reference Code. This column consists of two letters separated by a dash, both of which are references to section II. The first letter references Column (5), and the second letter references a maintenance function, column (3), A through K.

b. Remarks. This column lists information pertinent to the maintenance function being performed, as indicated on the MAC, section II.

Section II. MAINTENANCE ALLOCATION CHART

(1)	(2)	(3) Maintenance functions											(4)	(5)
		A	B	C	D	E	F	G	H	I	J	K		
Group No.	Functional Group	Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild	Tools and equipment	Remarks
01	ENGINE													
0120	Engine Assembly, Skid Mounted													
	Engine assembly, gas turbine, with dual gear pad	O	O	O	--	--	--	--	F	F	D	D	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25	A
0121	COMPRESSOR ASSEMBLY													
	Compressor assembly	--	--	--	--	--	--	--	D	D	D	D	26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47	
	Plenum, air	O	--	O	--	--	--	--	F	H	D			
	Shaft torsional	F	--	--	--	--	--	--	F					
0122	Combustion Assembly													
	Cap Assy., Combustion	O	--	--	--	--	--	--	O	H				
	Flame tube	O	--	O	--	--	--	--	O	H	--	--	----	B
	Pipe assy., exhaust	O	--	--	--	--	--	--	F	H	--	--	63	
	Plenum, turbine	O	--	--	--	--	--	--	F	H	D	--	----	C
	Torus, assembly	O	--	--	--	--	--	--	F	H	D	D		
0123	Turbine Assembly													
	Turbine assembly	O	--	--	--	--	--	--	D	D	D	D	32, 47, 64	
	Turbine nozzle	F	--	--	F	--	--	--	F	--	--	--	----	D
0125	Accessory Drive Assy.													
	Drive Assy. Access	O	--	--	--	--	--	--	F	F	D	--	4, 5, 65, 66, 69, 70, 71	
	Drive assy., dual pad	O	--	--	--	--	--	--	F	F	D	--	72	
	Shaft torsion	F	--	--	--	--	--	--	F					
	Packing, torsion shaft	F	--	--	--	--	--	--	F					
	Seal, oil pump	O	--	--	--	--	--	--	F	--	--	--	67, 68	
	Seals, gen. drive shaft	O	--	--	--	--	--	--	F					

(1)	(2)	(3) Maintenance functions											(4)	(5)
		A	B	C	D	E	F	G	H	I	J	K		
Group No.	Functional Group	Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild	Tools and equipment	Remarks
0126	FUEL CONTROL													
	Fuel control assy	O	O	--	O	--	--	--	O	F	D	D	2, 3, 73, 76, 77, 78, 79, 82, 85	E, F, A
	Atomizer, fuel	O	O	O	--	--	--	--	O	--	D	D	74, 75, 80, 81, 84	G, H
	Pump, fuel boost	O	O	O	--	--	--	--	O	F	D	D		
	Solenoid, fuel	O	O	--	--	--	--	--	O	F	D	D	82, 83	
	Shaft, quill	O	--	--	--	--	--	--	O					
	Valve, plenum, drain	O	--	--	--	--	--	--	O					
	Filter elements, fuel	O	--	O	--	--	--	--	O					
0127	Lubrication System													
	Pump, assembly oil	O	--	O	--	--	--	--	O	--	D	D		
	Filter element, oil	O	--	O	--	--	--	--	O					
	Tank, oil	O	--	O	--	--	--	--	O	F				
	Pump assy, scavenge	O	--	--	--	--	--	--	O	--	D	D		
	Line and hoses	O	--	--	--	--	--	--	O	F				
	Valve, oil temp reg.	O	--	--	--	--	--	--	O	D	D	D	98, 105, 109	
	Cooler, oil	O	--	--	--	--	--	--	O	D	D	D	86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98	
	Fan assy., oil cooling	O	--	--	--	--	--	--	O	--	D	D	47, 144, 146, 147	
06	ELECTRICAL SYSTEM													
0603	Starting Motor													
	Starter assembly	O	O	--	--	--	--	--	O	D	D	D		
	Motor starting	O	O	--	--	--	--	--	O	D	D	D	150, 152, 153, 154, 155, 156, 157, 158	
	Clutch, starter	O	--	--	F	--	--	--	F	F	D	D	148, 149, 151	
	Relay, starter	O	O	--	--	--	--	--	O	F				
	Cables, starter	O	--	--	--	--	--	--	O	F				
0606	Ignition Components													
	Ignition unit	O	O	--	--	--	--	--	O					
	Igniter plug	O	O	O	--	--	--	--	O	--	--	--	----	I
	Lead high tension	O	O	--	--	--	--	--	O					

(1)	(2)	(3) Maintenance functions											(4)	(5)
		A	B	C	D	E	F	G	H	I	J	K		
Group No.	Functional Group	Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild	Tools and equipment	Remarks
0606	ENGINE SAFETY CONTROLS													
	Switch, low oil press.	O	O	—	—	—	—	—	O					
	Switch, door interlock	O	O	—	O	—	—	—	O					
	Switch assy., centrifugal	O	O	—	O	—	D	—	O	F	D	D	99, 100, 101 102, 103	
	Thermostat, load control	O	O	O	O	—	D	—	O	—	—	—	104	
	Thermostat, accel.	O	O	O	O	—	D	—	O	—	—	—	104	
	Switch, oil sequence	O	O	—	O	—	O							
0608	MISCELLANEOUS ITEMS													
	Charger, battery	O	O	—	O	—	—	—	O	H	D	D		
0610	Sending Units And Warning Switches													
	Thermocouple, exhaust temperature	O	O	—	—	—	—	—	O					
0612	Battery Storage													
	Battery	O	O	O	—	—	—	—	O					
	Cable, lead and ground	O	—	—	—	—	—	—	O	F				
	Holder, battery	O	—	—	—	—	—	—	O	F				
0613	Wiring Harness	O	O	—	—	—	—	—	O	F				
18	BODY, CAB, HOOD AND HULL													
	Body, Cab, Hood, Hull Assemblies													
	Enclosure assembly	O	—	—	O	—	—	—	D	F	D	D		
	Filter, air intake	O	—	O	—	—	—	—	O	O				
	Doors, enclosure	O	—	O	—	—	—	—	O	F	D	D		
22	BODY CHASSIS OR HULL, AND ACCESSORY ITEMS													
2210	Data Plates													
	Plates, data	O	—	—	—	—	—	—	F					
	Plates, instruction	O	—	—	—	—	—	—	O					
33	SPECIAL PURPOSE KITS													
3303	Winterization Kit	O	—	O	—	—	—	—	F	F	D	D		
40	ELECTRIC GENERATORS													
4000	Generators	O	O	—	—	—	—	—	O	D	D	D		
4001	Rotor Assemblies	—	D	—	—	—	—	—	D	D	D	D		
4002	Stator Assemblies	—	D	—	—	—	—	—	D	D	D	D		
4005	Bearings	D	—	—	—	—	—	—	D					
4004	Ventilating System													
	Ducts, cooling and heating	O	—	—	—	—	—	—	O	O				
	Filters, air	O	—	O	—	—	—	—	O	O				
	Hoses and clamps	O	—	—	—	—	—	—	O					

(1)	(2)	(3) Maintenance functions											(4)	(5)
		A	B	C	D	E	F	G	H	I	J	K		
Group No.	Functional Group	Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild	Tools and equipment	Remarks
4006	Protective Devices													
	Protective panel, 60 Hz	O	O	--	--	--	--	--	O	D	D	D		
	Protective panel, 400 Hz	O	O	--	--	--	--	--	O	D	D	D		
4009	Control Panels	O	O	--	--	--	--	--	O	F	D	D		
4012	Switches	O	O	--	--	--	--	--	O	F				
4013	Regulators, Voltage or Current													
	Voltage regulator 60 Hz	O	O	--	--	--	--	--	O	--	D			
	Voltage regulator 400 Hz	O	O	--	O	--	--	--	O	--	D			
42	ELECTRICAL EQUIPMENT													
4201	Power Lines													
	400 Hz power cable assembly	O	--	--	--	--	--	--	O	H	D	D		
	60 Hz power cable assembly	O	--	--	--	--	--	--	O	H	D	D		
4202	ELECTRIC CONTROLS													
	Controls, electrical	O	O	--	--	--	--	--	O	F	D	D		
	Controls, water sys.	O	O	--	--	--	--	--	O	F	D	D		
	Controls, environmental	O	O	--	--	--	--	--	O	F	D	D		
4203	CIRCUIT BREAKERS, CUTOUT DEVICES FUSE AND FUSE HOLDERS													
	Switches	O	O	--	--	--	--	--	O					
	Relays	O	O	--	--	--	--	--	O	--	D			
	Circuit breakers	O	O	--	--	--	--	--	O	H	D			
4211	Power Receptacles													
	Power panel	O	--	--	--	--	--	--	O	F	D	D		
	Receptacles, 60 and 400 Hz	O	O	--	--	--	--	--	O	F				
43	HYDRAULIC, FLUID, AIR AND VACUUM SYSTEM													
4305	Manifold and/or Control Valve													
	Regulator, load control	O	--	O	O	--	--	--	O	D	D	D		
	Valve, load control	O	--	--	O	--	--	--	O	H	D	D	48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62	J K
4315	Ejector, Inflatable Air	O	--	O	--	--	--	--	O	F				
4316	Hoses, Lines, Fittings and Connectors	O	--	--	--	--	--	--	O	F				
4317	Valves	O	--	--	--	--	--	--	O	F				

(1)	(2)	(3) Maintenance functions											(4)	(5)
		A	B	C	D	E	F	G	H	I	J	K		
Group No.	Functional Group	Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild	Tools and equipment	Remarks
52	REFRIGERATION AND AIR CONDITIONING COMPONENTS *Note:* Maintenance functions may be accomplished at organizational level if using unit includes personnel with MOS51L20-T.													
5200	Gas Compressor Assembly													
	Motor compressor assembly	O	O	F	--	--	--	--	F	D	D	D	106, 107, 108, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120	
5217	Refrigerant Piping													
	Lines	O	F	--	--	--	--	--	F	F	--	--	106	
	Valves, solenoid	O	O	--	--	--	--	--	F	F	D	D	106	
	Pressure controls	O	O	--	--	--	--	--	F	F	D	D	106	
	Metering devices	O	F	--	--	--	--	--	F	--	--	--	106	
5224	Refrigerant Accumulator													
	Receivers	O	--	F	--	--	--	--	F	F	--	--	106, 163	
5230	Condenser													
	Coil, condenser	O	F	O	--	--	--	--	F	D	D	D	106, 159, 160, 161	L
5235	Dehydrating Equipment													
	Dryer-filter	O	--	--	--	--	--	--	F	--	--	--	106	
5241	Evaporator													
	Coil, Evaporator	O	F	O	--	--	--	--	F	D	D	D	106, 159, 160, 162	L
5243	Blower Assembly													
	Fans, recirculating	O	--	O	--	--	--	--	O	F	D	D	121, 122, 123, 124, 125, 126, 127, 128, 129	
	Fans, condenser	O	--	O	--	--	--	--	O	F	D	D	121, 126, 127, 129, 130, 131, 132, 133	

(1)	(2)	(3) Maintenance functions											(4)	(5)
		A	B	C	D	E	F	G	H	I	J	K		
Group No.	Functional Group	Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild	Tools and equipment	Remarks
5244	TEMPERATURE CONTROL													
	Temperature, sensor	O	O	--	--	--	--	--	O					
	Temperature, control panel	O	--	--	--	--	--	--	O	F	D	D		
5245	Air Filter													
	Filter	O	--	O	--	--	--	--	O					
5247	Heating Units													
	Heat exchanger, air	O	O	--	--	--	--	--	O	H	D	D	164	M
	Valves, flow control	O	O	--	--	--	--	--	O	F	D	D		
	Valves, flow control	O	O	--	--	--	--	--	O	F	D	D	48, 52, 53, 55, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 145, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176	
	Manifold, heat distr.	O	--	--	--	--	--	--	O	H				
	Lines, hot air	O	--	--	--	--	--	--	O	H				
	Switch, thermo	O	O	--	--	--	--	--	O					
	Sensor, heat temp.	O	O	--	--	--	--	--	O					
60	STEAM BOILERS, WATER HEATERS HEATING UNITS, BURNERS													
6002	Feed Waterline													
	Connectors	O	--	--	--	--	--	--	O					
	Fittings and valves	O	--	--	--	--	--	--	O	F				
6012	PUMP, CIRCULATING													
	Pump, hot water	O	O	--	--	--	--	--	O	D	D	D		
	Pump, cold water	O	O	--	--	--	--	--	O	D	D	D		
6013	Boiler Water	O	--	--	--	--	--	--	F	H	D	D		
	Exhaust	O	--	--	--	--	--	--	O	H				
	Valve, solenoid	O	O	--	--	--	--	--	O	H	D	D		
6015	Water Heater Assembly													
	Tank, storage, hot water	O	--	--	--	--	--	--	O	H				
	Switch, press. cold water	O	O	--	--	--	--	--	O					
	Tank, surge, cold water	O	--	--	--	--	--	--	O	H				
	Switch thermostatic	O	O	--	--	--	--	--	O					
	Valve, relief	O	O	--	--	--	--	--	O					
	Valve, check	O	--	--	--	--	--	--	O	F				
	Valve, tank bleed	O	--	--	--	--	--	--	O	F				

(1)	(2)	(3) Maintenance functions											(4)	(5)
		A	B	C	D	E	F	G	H	I	J	K		
Group No.	Functional Group	Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild	Tools and equipment	Remarks
6015	Water Heater Assembly—Continued													
	Valve, flow control	O	—	—	—	—	—	—	O	F	D	D		
	Valve, shutoff, water	O	—	—	—	—	—	—	O	—	D	D	165	
	Lines and fittings	O	—	—	—	—	—	—	O	F				
	Hose assembly, hot and cold water	O	—	—	—	—	—	—	O	F	H			
	Heated, water hose supply	O	O	—	—	—	—	—	O	F				
76	FIRE FIGHTING EQUIPMENT COMPONENTS													
7603	Fire-Extinguisher	O	—	O	—	—	—	—	O					

Section III. SPECIAL TOOL AND SPECIAL TEST EQUIPMENT REQUIREMENTS

Reference code	Maintenance level	Nomenclature	Tool number
1-H	F	Stand Portable, Gas Turbine Engine	(99193) 281270-0-3
2-B	O	Engine Analyzer	4920-778-6091
3-B	O	Cable Assembly	(99193) 284692-1
4-I	F	Wrench, Spanner	5120-793-0701
5-I	F	Adapter, Wrench	5120-606-6794
6-H	H	Sling, Beam Type Adjustable	(99193) 281518-3
7-H	F	Mount, Gas Turbine Engine	1730-015-8005
8-H	F	Mount, Gas Turbine Engine	1730-015-8002
9-H	F	Adapter, Maintenance Stand	(99193) 284946-1-1
10-J	D	Hose Assembly, Metal	4920-608-8214
11-J	D	Duct, Gas Turbine Bleed Air	4920-734-1728
12-J	D	Vibration Mount, Vibration Pickup	4920-736-6299
13-J	D	Mount, Vibration Pickup	4920-677-7685
14-J	D	Plug, End Seal, Flange	(99193) 268014-3
15-J	D	Test System, Gas Turb. Eng.	(99193) 281700
16-J	D	Thermocouple, Immersion	6685-722-7210
17-J	D	Gage, Elongation, Turbine Wheel Shaft	5220-754-4909
18-J	D	Holder, Turbine Wheel Shaft	4920-015-4303
19-J	D	Adapter, Torque Wrench Splined	5120-738-5913
20-J	D	Adapter, Torque Wrench	4920-015-1768
21-B	H	Test Kit, Bleed-Air Flow, Turbine	(99193) 285146-1-1
22-J	D	Adapter, Tail Pipe	(99193) 285148-1-1
23-J	D	Panel Assembly, Electrical Control	(99193) 285149-1-1
24-J	D	Cable and Relay Assembly, Special Purpose, Electrical	(99193) 285150-1-1
25-I	H	Dolly Set, Utility Package, Transporting	(99193) 285186-1-1
26-I	D	Driver, Seal, Hand	5120-679-2675
27-J	D	Adapter, Torque Wrench	5120-738-5011
28-J	D	Adapter, Hoisting	1730-015-8024
29-J	D	Driver, Seal Pressing	5120-738-5909
30-J	D	Driver, Bearing and Bushing	5120-738-5919
31-J	D	Puller, Mechanical, Bearing	4920-015-4301
32-J	D	Holder, Concentricity Checking	4920-738-4301
33-J	D	Puller, Mechanical, Impeller	5120-738-6280
34-J	D	Puller, Mechanical, Impeller	5120-738-6278
35-J	D	Holder, Concentricity Checking	4920-808-3374
36-J	D	Arbor, Balancing, Impeller	6635-869-7422
37-J	D	Arbor, Balancing, Impeller	6635-869-7421
38-J	D	Puller, Assembly, Bearing and Bushing	(99193) 284045-1-1
39-J	D	Alignment Tool, Support	(99193) 284063-1-1
40-J	D	Spacer, Impeller	(99193) 284307-1-1
41-J	D	Dummy Bearing	(99193) 284314-1-1
42-J	D	Fixture, Checking, Wheel to Shroud Clearance	(99193) 284381-1-1
43-J	D	Alignment Tool, Bearing, Housing and Diffuser	(99193) 284798-1-1
44-J	D	Gage, Curvic Coupling, Concave	(99193) 285372-1-1
45-J	D	Gage, Curvic Coupling, Convex	(99193) 285373-1-1
46-J	D	Curvic Coupling Checking Machine	(99193) Mdl No. 19
47-J	D	Balancing Machine, Dynamic Static, Horizontal	(99193) Mdl No. 135
48-J	D	Holder, Pneumatic Valve Test	4920-547-0521
49-J	D	Adapter, Valve Test	4920-546-2608
50-J	D	Adapter, Valve Test	4920-545-7397
51-J	D	Wrench, Socket, Internal Spline	5120-631-8914
52-J	D	Test Panel, Pneumatic Control	4920-625-3777
53-J	D	Adapter Set, Valve Test	4920-473-9237
54-J	D	Puller, Mechanical, Carbon Seal	4920-804-9012

Reference code	Maintenance level	Nomenclature	Tool number
55-J	D	Puller, Mechanical, Carbon Seal	5120-757-1808
56-J	D	Cable, Special Purpose, Elec.	(99193) 281811-4
57-J	D	Gage Assembly, Lever Adj.	(99193) 281987-1-1
58-J	D	Gage, Shim Clearance	4920-911-6423
59-J	D	Restrictor Unit, Air Flow	4920-101-9545
60-J	D	Restrictor Unit, Air Flow	4920-911-1058
61-J	D	Holder and Gage, Solenoid Rod Trimming	(99193) 284241-1-1
62-J	D	Flow Restrictor, Bellmouth, Calibrated	(99193) 284836-1-1
63-H	F	Wrench, Spanner	5120-320-9613
64-J	D	Cradle, Balancing, Wheel	4920-015-4329
65-I	F	Puller, Mechanical, Fan	5120-330-8527
66-I	F	Driver, Seal	5120-525-8557
67-H	F	Driver, Seal	5120-733-7113
68-H	F	Puller, Mechanical Seal	5120-608-8239
69-I	F	Holder, Seal Installing	4920-614-8483
70-J	D	Holder, Bearing Pressing	(99193) 284224-1-1
71-J	D	Cap, Pressure Test	(99193) 284521-1-1
72-J	D	Adapter, Wrench, External Spline	(99193) 285091-1-1
73-J	D	Driver, Seal, Hand	5120-330-8548
74-J	D	Holder, Atomizer, Gas Turbine	4920-334-5147
75-J	D	Adapter, Torque Wrench	5120-330-8551
76-J	D	Puller, Mechanical, Gov. Cage Assembly	5120-506-8278
77-J	D	Puller, Mechanical, Seal, Fuel Pump	5120-511-0268
78-J	D	Lapping Tool, Bushing, Hand	5120-566-9840
79-D	O	Screwdriver and Wrench Assembly	5120-668-6122
80-J	D	Tester, Fuel Nozzle	(99193) 281450-1
81-J	D	Holder, Atomizer Distributor	5120-788-1009
82-J	D	Test Stand, Fuel Accessories	(99193) 281600-4-1
83-J	D	Cable, Special Purpose Elec.	(99193) 281811-6
84-I	H	Adapter, Fuel Atomizer	4920-924-1196
85-J	D	Pilot, Shaft Installing	4920-909-7264
86-I	D	Puller, Tube	5120-511-1606
87-I	D	Holder, Tool, Tube	5120-566-2525
88-I	D	Puller, Tube	5120-376-2831
89-I	D	Handle, Tool, Tube	5120-025-2865
90-I	D	Tip, Bumping Tube	5120-565-3637 5120-536-9616 5120-048-3033
91-I	D	Roller, Burring Tube	5120-212-4080
92-I	D	Expander, Tube, Roller	5120-329-6576
93-I	D	Tip, Pulling, Tube	5120-511-1609
94-I	D	Loosening Tool, Tube	5120-216-7238
95-I	D	Swaging Machine, Tube and Header	(99193) 256116-1
96-I	D	Bit Swaging Machine	5120-675-0040 3456-675-0051 5120-963-2459
97-B	D	Adapter, Leakage Test, Oil Cooler	4920-591-0385
98-B	D	Stand, Test, Oil Temp Control Valve, Synthetic	4920-547-9009
99-J	D	Fixture, Assembly	4920-704-0376
100-F	D	Adapter, Switch Calibration	4920-704-0387
101-F	D	Calibration Set, Centrifugal Switch	(99193) 281976-2-1
102-B	D	Test, Leakage, Centrifugal Switch	(99193) 284386-1-1
103-F	D	Cable, Special Purpose, Elec.	(99193) 285145-1-1
104-F	D	Calibrator, Thermostat	(99193) 284526-1-1
105-B	D	Holder, Test, Oil Temp Control Valve, Synthetic	4920-545-2440
106-H	F	Service Kit, Refrigeration	(99193) 273898-1-1
107-J	D	Reamer, Hand	(99193) 253471-1
108-J	D	Reamer, Hand	(99193) 253471-2
109-J	D	Cutter, Valve Seat, Hand	5110-391-0411

Reference code	Maintenance level	Nomenclature	Tool number
110-J	D	Adapter, Bushing Staking	5120-019-9371
111-J	D	Driver, Bushing and Slinger	(99193) 266360-7
112-J	D	Holder, Pressing and Reaming Bushing and Slinger	(99193) 266362-10
113-J	D	Holder Assembly, Refrigerant Compressor	(99193) 268039
114-J	D	Arbor, Balancing	(99193) 268152-4 and -5
115-J	D	Adapter, Pressing and Reaming Holder	(99193) 272599
116-J	D	Arbor, Balancing	(99193) 278028-7 and -8
117-J	D	Holder and Driver, Bearing Press	(99193) 278177
118-J	D	Puller, Mechanical, Bearing	(99193) 278179
119-J	D	Insert Set, Balancing Support	5120-085-7346
120-B	D	Test Stand, Refrigerant Compressor	(99193) 905142-1-1
121-J	D	Fixture End Play Measuring	(99193) 905128-1-1
122-J	D	Insert Set, Balancing Support	(99193) 278303-2
123-I	F	Wrench, Torque Holding Fix.	(99193) 272663
124-J	D	Fixture, Bearing Press	(99193) 272166
125-J	D	Arbor, Balancing, Fan and Wheel	(99193) 268145-1 and -2
126-J	D	Test Set, Insulation Breakdown AC and DC	(99193) 259814-1
127-J	D	Test Set Electrical-High Current A-C Motor	(99193) 278039
128-J	D	Cable Assembly, Special Purpose Electrical	(99193) 905113-1
129-J	D	Test Fixture Motor Driven Fan	(99193) 905124-1-1
130-I	F	Wrench, Torque, Holding Fixture	(99193) 905136-1
131-J	D	Arbor Set, Balancing, Fan and Wheel	(99193) 905134-1-1
132-J	D	Fixture Bearing Press	(99193) 905127-1
133-J	D	Cable Assembly, Special Purpose Electrical	(99193) 901077
134-J	D	Adapter, Valve Test	(99193) 253072-10
135-J	D	Driver, Bearing, Needle	(99193) 253452-10
136-J	D	Puller, Mechanical, Bearing Extending Collet	(99193) 267104
137-J	D	Wrench, Socket, Internal Spline	5120-717-1436
138-J	D	Driver, Retainer	(99193) 281746-1
139-J	D	Cable, Special Purpose, Elec.	(99193) 281811-5
140-J	D	Gage, Bearing End Play	(99193) 284080-2-1
141-J	D	Adapter, Torque Wrench	(99193) 284107-1-1
142-J	D	Holder, Shim Checking	(99193) 284115-1-1
143-J	D	Cable, Special Purpose, Elec.	(99193) 285534-1
144-J	D	Insert, Balancing Support, Rotating Assembly	(99193) 256377-9
145-J	D	Adapter, Valve Test	(99193) 257562-67
146-J	D	Mandrel, Machined, Solid Straight	5180-066-7832
147-J	D	Adapter, Balancing, Fan	(99193) 285092-1-1
148-D	F	Holder, Clutch Torquing	4920-336-0648
149-D	F	Adapter Torque Wrench	5120-608-4756
150-I	D	Cap, Pressure Test	(99193) 284522-1-1
151-J	D	Wrench, Spanner Starter Jaw	(99193) 285090-1-1
152-B	D	Dynomometer, Motor Test	6625-035-7025
153-B	D	Panel, Test, Electrical	6625-704-4301
154-J	D	Puller, Bearing	5120-631-8950
155-J	D	Adjuster End Play, Rotor, Multi-Purpose	4920-601-1144
156-J	D	Test Set, Armature	6625-556-1601
157-B	D	Tester, Leakage, Motor Seal	(99193) 272418-1-1
158-J	D	Holder, Bearing Press	(99193) 278399-1-1
159-I	D	Repair Kit, Leakage, Heat Exch.	(99193) 278197
160-I	H	Plate, End Seal	(99193) 268129
161-I	H	Plate End Seal	(99193) 905137-1
162-I	H	Plate, Adapter Flange	(99193) 268128
163-I	F	Plate, End Seal	(99193) 268129-1
164-B	D	Plate, Adapter, Flange	(99193) 268128-5
165-J	D	Gage, Butterfly Adjusting	5120-941-7219
166-J	D	Puller, Bearing	5120-631-8950
167-J	D	Dynomometer Motor Test	6625-704-4300
168-J	D	Adjuster Break Gap, Motor	4920-348-9001

Reference code	Maintenance level	Nomenclature	Tool number
169-J	D	Test Set Electrical Power	(99193) 257916-1
170-J	D	Test Set, Insulation Breakdown, AC-DC	6625-519-2204
171-J	D	Holder, Bearing Press	4920-153-5294
172-J	D	Adjuster, End Play, Rotor Multi-Purpose	4920-601-1144
173-J	D	Test Set, Armature	6625-556-1601
174-J	D	Test Set, Actuator Load	(99193) 268100-1
175-J	D	Adapter Actuator Torque	(99193) 270906-3
176-J	D	Coupling, Shaft, Rigid	(99193) 278130
177-H	O	Wire Twister, Plier	5120-305-2306

Section IV. REMARKS

Reference code	Remarks
A-B	Test engine using engine analyzer test set.
B-I	Repair consists of welding. (Do not weld ceramic coated tubes).
C-I	Minor weld only.
D-A	Turbine Nozzle Assembly may be rotated 120° as warranted by inspection.
E-D	Speed and cracking pressure only.
F-I	Replace "O" rings and diaphragms only.
G-C	Clean fuel atomizer (do not use abrasive material).
H-B	Test for flow divider opening only.
I-C	Clean only if new ignitor plug is not available.
J-D	Adjust opening rate only.
K-I	Replace seals only.
L-I	Repair includes using a repair kit.
M-H	Heat Exchanger, Air, applicable to model PPU85-4 and Winterization Kit, P/N 891459-1 only.

INDEX

	Paragraphs	Page
AC Ammeter (60 Hz)	2-10	2-30
Description	2-10	2-30
Indication	2-10	2-30
Purpose	2-10	2-30
AC Ammeter (400 Hz)	2-11	2-32
Description	2-11	2-32
Indication	2-11	2-32
Purpose	2-11	2-32
AC Voltmeter (60 Hz)	2-10	2-30
Description	2-10	2-30
Indication	2-10	2-30
Purpose	2-10	2-30
AC Voltmeter (400 Hz)	2-11	2-32
Description	2-11	2-32
Indication	2-11	2-32
Purpose	2-11	2-32
Acceleration and overtemperature control thermostat	3-8, 3-26	3-18, 3-42
Installation	3-26	3-42
Removal	3-26	3-42
Access panels and doors	3-81	3-95
Installation	3-81	3-95
Removal	3-81	3-95
Accessory components	1-3	1-1
Accessory drive section	1-3	1-1
Adjustments	3-8	3-18
Acceleration and overtemperature control thermostat	3-8	3-18
Air pressure regulator	3-8	3-18
Centrifugal multi-speed switch setting	3-8	3-18
Fuel control assembly acceleration limiter valve cracking pressure adjustment	3-8	3-18
Fuel control assembly governor speed setting	3-8	3-18
Load control thermostat	3-8	3-18
After stopping procedures	2-15	2-35
Air pressure regulator	3-8, 3-71	3-18, 3-89
Adjustment	3-71	3-89
Installation	3-71	3-89
Removal	3-71	3-89
Air pressure regulator filter element	3-72	3-89
Adjustment	3-72	3-89
Cleaning and inspection	3-72	3-89
Installation	3-72	3-89
Removal	3-72	3-89
Auxiliary power switch	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
Auxiliary power trip indicator lamp	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24

	Paragraphs	Page
Batteries	4-1	4-1
Battery charger	1-4, 3-61	1-23, 3-68
Adjustment	3-61	3-68
Cleaning and inspection	3-61	3-68
Installation	3-61	3-68
Removal	3-61	3-68
Test	3-61	3-68
Battery charging ammeter	2-7	2-21
Description	2-7	2-21
Indication	2-7	2-21
Purpose	2-7	2-21
Battery charging circuit breaker	2-7	2-21
Description	2-7	2-21
Purpose	2-7	2-21
Battery servicing	2-1	2-1
New batteries	2-1	2-1
Used batteries	2-1	2-1
Bleed-air control system	1-3	1-1
Bleed-air load control valve	3-70	3-89
Installation	3-70	3-89
Removal	3-70	3-89
Burning	4-6	4-2
Centrifugal multi-speed switch assembly	3-45	3-51
Installation	3-45	3-51
Removal	3-45	3-51
Centrifugal multi-speed switch setting	3-8	3-18
Charging oil	3-4	3-1
Circuit breaker (gas turbine engine time totalizing meter)	3-51	3-54
Installation	3-51	3-54
Removal	3-51	3-54
Circuit breaker (CB1, CB2, CB9)	3-55	3-55
Cleaning and inspection	3-55	3-55
Installation	3-55	3-55
Removal	3-55	3-55
Circuit breaker (CB5, CB11, CB12, CB22)	3-55	3-55
Cleaning and inspection	3-55	3-55
Installation	3-55	3-55
Removal	3-55	3-55
Cleaning	3-4	3-1
Cold water pressure switch failure	3-10	3-31
Cold water pump switch	2-8	2-23
Description	2-8	2-23
Purpose	2-8	2-23
Cold water valve	2-8	2-23
Description	2-8	2-23
Purpose	2-8	2-23
Cold weather heater and battery activation switch (two used)	3-63	3-75
Cleaning and inspection	3-63	3-75
Installation	3-63	3-75
Removal	3-63	3-75
Cold weather heaters and battery activation switches	2-12	2-34
Compressed air and vacuum system:		
Compressed air and vacuum system components	3-79	3-95
General	3-78	3-95
Compressed air vacuum system components	3-79	3-95
Installation	3-79	3-95
Removal	3-79	3-95
Compressed air system	1-3, 1-4	1-1, 1-23

	Paragraphs	Page
Compressed air system connections	2-3	2-5
Compressor and turbine section	1-3	1-1
Compressor compartment stowable items label	1-4	1-23
Compressor motor circuit breaker (two used, system no. 1 and no. 2)	3-56	3-60
Cleaning and inspection	3-56	3-60
Installation	3-56	3-60
Removal	3-56	3-60
Compressor motor circuit breaker (no. 1 system)	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
Compressor motor circuit breaker (no. 2 system)	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
Compressor time totalizing meter (no. 1 system)	2-9	2-24
Description	2-9	2-24
Indication	2-9	2-24
Purpose	2-9	2-24
Compressor time totalizing meter (no. 2 system)	2-9	2-24
Description	2-9	2-24
Indication	2-9	2-24
Purpose	2-9	2-24
Condenser cooling fan, fan mounting plate, and shock mount	3-68	3-86
Installation	3-68	3-86
Removal	3-68	3-86
Condenser fans (2 used)	1-4	1-23
Condenser fans circuit breaker (no. 1 system)	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
Condenser fans circuit breaker (no. 2 system)	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
Condensers (2 used)	1-4	1-23
Conditioned air mode selector switch	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
Conditioned air outlet compartment divider panel installation	2-3	2-5
Conditioned air outlet compartment stowable items label	1-4	1-23
Conditioned air system	1-3, 1-4	1-1, 1-23
Cooled air system	1-3	1-1
Heated air system	1-3	1-1
Ventilating air system	1-3	1-1
Conditioned air system circuit breaker panel	3-56	3-60
Compressor motor circuit breaker (two used, system no. 1 and no. 2)	3-56	3-60
Panel lamp assembly	3-56	3-60
Recirculating fans and condenser fans circuit breakers (two of each used, system no. 1 and no. 2)	3-56	3-60
Time totalizing meter (two used, system no. 1 and no. 2)	3-56	3-60
Time totalizing meter circuit breaker (two used, system no. 1 and no. 2)	3-56	3-60
Conditioned air system connections	2-3	2-5
Conditioned air system controls and instruments	2-9	2-24
Auxiliary power switch	2-9	2-24
Auxiliary power trip indicator lamp	2-9	2-24
Compressor motor circuit breaker (no. 1 system)	2-9	2-24
Compressor motor circuit breaker (no. 2 system)	2-9	2-24
Compressor time totalizing meter (no. 1 system)	2-9	2-24
Compressor time totalizing meter (no. 2 system)	2-9	2-24
Condenser fans circuit breaker (no. 1 system)	2-9	2-24
Condenser fans circuit breaker (no. 2 system)	2-9	2-24
Conditioned air mode selector switch	2-9	2-24

	Paragraphs	Page
Conditioned air systems controls and instruments—Continued		
Conditioned air system controls circuit breaker	2-9	2-24
Cooled air system indicating lamp (no. 1 system)	2-9	2-24
Cooled air system indicating lamp (no. 2 system)	2-9	2-24
Cooled air system selector switch	2-9	2-24
Cooled air system temperature control (no. 1 system)	2-9	2-24
Cooled air system temperature control (no. 2 system)	2-9	2-24
General	2-9	2-24
Heated air system selector switch	2-9	2-24
Heated air system temperature control (no. 1 system)	2-9	2-24
Heated air system temperature control (no. 2 system)	2-9	2-24
Heating range selector switch (no. 1 system)	2-9	2-24
Heating range selector switch (no. 2 system)	2-9	2-24
No. 1 system compressor reset button	2-9	2-24
No. 1 system compressor trip indicator lamp	2-9	2-24
No. 2 system compressor reset button	2-9	2-24
No. 2 system compressor trip indicator lamp	2-9	2-24
Panel illumination lamp	2-9	2-24
Panel illumination lamp	2-9	2-24
Panel illumination lamps	2-9	2-24
Panel lights switch	2-9	2-24
Recirculating fans circuit breaker (no. 1 system)	2-9	2-24
Recirculating fans circuit breaker (no. 2 system)	2-9	2-24
Time totalizing meter circuit breaker (no. 1 system)	2-9	2-24
Time totalizing meter circuit breaker (no. 2 system)	2-9	2-24
Ventilating system selector switch	2-9	2-24
Conditioned air system controls circuit breaker	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
Conditioned air system practical wiring diagram	1-4	1-23
Connection of gas turbine engine analyzer to power unit	3-8	3-18
Controls and instruments:		
Conditioned air system controls and instruments	2-9	2-24
Electrical output connection panel controls	2-12	2-34
Gas turbine engine controls and instruments	2-7	2-21
General	2-6	2-21
Water system controls	2-8	2-23
60 Hz electrical system controls and instruments	2-10	2-30
400 Hz electrical system controls and instruments	2-11	2-32
Cooled air lamp assembly (two used, system no. 1 and no. 2)	3-58	3-65
Cleaning and inspection	3-58	3-65
Installation	3-58	3-65
Removal	3-58	3-65
Cooled air system:		
Condenser cooling fan, fan mounting plate and shock mount	3-68	3-86
General	3-66	3-85
Recirculating air fan and fan shroud assembly	3-67	3-86
Cooled air system	1-3	1-1
Cooled air system indicating lamp (no. 1 system)	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
Cooled air system indicating lamp (no. 2 system)	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
Cooled air system schematic	1-4	1-23
Cooled air system selector switch	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24

Paragraphs Page

- Cooled air system temperature control (no. 1 system) 2–9 2–24
  - Description 2–9 2–24
  - Purpose 2–9 2–24
- Cooled air system temperature control (no. 2 system) 2–9 2–24
  - Description 2–9 2–24
  - Purpose 2–9 2–24
- Cooled air temperature control switch (two used) (system no. 1 and no. 2) 3–58 3–65
  - Cleaning and inspection 3–58 3–65
  - Installation 3–58 3–65
  - Removal 3–58 3–65
- Cooling fan assembly 3–39 3–48
  - Installation 3–39 3–48
  - Removal 3–39 3–48

- Demolition by explosives 4–5 4–2
- Demolition by explosives or weapons' fire 4–5 4–2
  - Demolition by explosives 4–5 4–2
  - Demolition by weapons' fire 4–5 4–2
- Demolition by mechanical means 4–4 4–2
- Demolition by misuse 4–4 4–2
- Demolition by weapons' fire 4–5 4–2
- Demolition of material to prevent enemy use:
  - Demolition by explosives or weapons' fire 4–5 4–2
  - Demolition to render power unit inoperative 4–4 4–2
  - General 4–3 4–2
  - Other demolition methods 4–6 4–2
  - Training 4–7 4–2
- Demolition to render power unit inoperative 4–4 4–2
  - Demolition by mechanical means 4–4 4–2
  - Demolition by misuse 4–4 4–2
- Description and data:
  - Description 1–3 1–1
    - Accessory components 1–3 1–1
    - Compressed air system 1–3 1–1
    - Conditioned air system 1–3 1–1
    - Enclosure 1–3 1–1
    - Gas turbine engine power plant 1–3 1–1
    - General 1–3 1–1
    - Power unit electrical system 1–3 1–1
    - Vacuum system 1–3 1–1
    - Water system 1–3 1–1
- Detailed lubrication information 3–4 3–1
  - Changing oil 3–4 3–1
  - Cleaning 3–4 3–1
  - Flushing lubrication system 3–4 3–1
  - General 3–4 3–1
- Difference in models 1–5 1–33
- Disconnection of accessory components 2–4 2–12
- Dismantling for movement 2–4 2–12
  - Disconnection of accessory components 2–4 2–12
  - Final procedures 2–4 2–12
  - Fork lifting 2–4 2–12
  - Hoisting 2–4 2–12
  - Shipment 2–4 2–12
  - Skidding 2–4 2–12
  - Stowage of accessory components 2–4 2–12
  - Unloading 2–4 2–12
  - Wheeled transporter 2–4 2–12
- Door interlock switch failure (S4, S27, S28, S33, S34) 3–10 3–31

	Paragraphs	Page
Electrical output connection panel controls	2–12	2–34
Cold weather heaters and battery activation switches	2–12	2–34
Fuel heater circuit breaker	2–12	2–34
General	2–12	2–34
Panel illumination lamp	2–12	2–34
Reverse polarity indicating lamp	2–12	2–34
Water line heaters circuit breakers	2–12	2–34
60 Hz convenience receptacle circuit breaker	2–12	2–34
400 Hz convenience receptacle circuit breaker	2–12	2–34
Emergency operation	2–16	2–35
Emergency operation indicator lamp	2–7	2–21
Description	2–7	2–21
Purpose	2–7	2–21
Emergency operation switch	2–7	2–21
Description	2–7	2–21
Purpose	2–7	2–21
Enclosure:		
Access panels and doors	3–81	3–95
General	3–80	3–95
Enclosure	1–3	1–1
Engine electrical starter	3–44	3–51
Installation	3–44	3–51
Removal	3–44	3–51
Engine electrical system:		
Centrifugal multi-speed switch assembly	3–45	3–51
Circuit breaker	3–51	3–54
Engine electrical starter	3–44	3–51
Exhaust gas thermocouple	3–52	3–54
General	3–42	3–50
Igniter plug	3–48	3–53
Ignition lead assembly	3–49	3–53
Ignition unit	3–47	3–53
Oil pressure sequencing switch	3–46	3–51
Time totalizing meter	3–50	3–54
Wiring harness assembly	3–43	3–50
Engine electrical system	1–3	1–1
Engine electrical system schematic	1–4	1–23
Engine fuel and bleed-air control system schematic	1–4	1–23
Engine fuel filter assy	3–18	3–35
Cleaning and inspection	3–18	3–35
Installation	3–18	3–35
Removal	3–18	3–35
Engine lubrication system schematic	1–4	1–23
Engine oil label	1–4	1–23
Engine time totalizing meter	2–7	2–21
Description	2–7	2–21
Indication	2–7	2–21
Purpose	2–7	2–21
Engine time totalizing meter circuit breaker	2–7	2–21
Description	2–7	2–21
Purpose	2–7	2–21
Environment control panel assembly	3–57	3–64
Relay armature (eight used, K19, K20, K21, K23, K24, K25, K26, K27)	3–57	3–64
Relay time delay (two used, K17, K18)	3–57	3–64
Thermal relay (three used)	3–57	3–64
Terminal strip	3–57	3–64
Evaporators (2 used)	1–4	1–23
Exhaust gas temperature indicator	3–55	3–55
Cleaning and inspection	3–55	3–55

	Paragraphs	Page
Exhaust gas temperature indicator—Continued		
Installation	3-55	3-55
Removal	3-55	3-55
Exhaust gas temperature indicator	2-7	2-21
Description	2-7	2-21
Indication	2-7	2-21
Purpose	2-7	2-21
Exhaust gas temperatures	1-4	1-23
Exhaust gas thermocouple	3-52	3-54
Installation	3-52	3-54
Removal	3-52	3-54
Exhaust gas to water heat exchanger	1-4	1-23
External fuel system filter elements	3-17	3-35
Cleaning and inspection	3-17	3-35
Installation	3-17	3-35
Removal	3-17	3-35
External 24v dc auxiliary power source connections	2-3	2-5
Field expedient repairs:		
General	3-9	3-31
Repairs	3-10	3-31
Filter assembly	3-20	3-35
Installation	3-20	3-35
Removal	3-20	3-35
Final procedures	2-4	2-12
Fire extinguisher	2-17	2-54
Maintenance	2-17	2-54
Recharging	2-17	2-54
Use	2-17	2-54
Flow control valve	3-74	3-89
Installation	3-74	3-89
Removal	3-74	3-89
Flushing lubrication system	3-4	3-1
Fork, lifting	2-4	2-12
Forms and Records	1-2	1-1
Frequency meter (60 Hz)	2-10	2-30
Description	2-10	2-30
Indication	2-10	2-30
Purpose	2-10	2-30
Frequency meter (400 Hz)	2-11	2-32
Description	2-11	2-32
Indication	2-11	2-32
Purpose	2-11	2-32
Fuel and lubrication system:		
Depreservation and servicing	2-1	2-1
Fuel Atomizer assembly, combustion cap assembly, and combustion liner assembly	3-25	3-38
Cleaning and inspection	3-25	3-38
Installation	3-25	3-38
Removal	3-25	3-38
Test	3-25	3-38
Fuel boost pump	3-21	3-35
Installation	3-21	3-35
Removal	3-21	3-35
Fuel boost pump switch	2-7	2-21
Description	2-7	2-21
Purpose	2-7	2-21
Fuel control assembly acceleration limiter valve cracking pressure adjustment	3-8	3-18
Fuel control assembly governor speed setting	3-8	3-18

	Paragraphs	Page
Fuel control fuel filter	3-19	3-35
Cleaning and inspection	3-19	3-35
Installation	3-19	3-35
Removal	3-19	3-35
Fuel control unit	3-24	3-38
Installation	3-24	3-38
Removal	3-24	3-38
Test	3-24	3-38
Fuel heater circuit breaker	2-12, 3-63	2-34, 3-75
Cleaning and inspection	3-63	3-75
Description	2-12	2-34
Installation	3-63	3-75
Purpose	2-12	2-34
Removal	3-63	3-75
Fuel heater switch	2-7	2-21
Description	2-7	2-21
Purpose	2-7	2-21
Fuel inlet decal	1-4	1-23
Fuel line heater circuit breaker	2-7	2-21
Description	2-7	2-21
Purpose	2-7	2-21
Fuel line heater indicator lamp	2-7	2-21
Description	2-7	2-21
Purpose	2-7	2-21
Fuel requirements	1-4	1-23
Fuel solenoid valve	3-23	3-36
Cleaning and inspection	3-23	3-36
Installation	3-23	3-36
Removal	3-23	3-36
Test	3-23	3-36
Fuel supply connections	2-3	2-5
Fuel system:		
Acceleration and overtemperature control thermostat	3-26	3-42
Engine fuel filter assy.	3-18	3-35
External fuel system filter elements	3-17	3-35
Filter assembly	3-20	3-35
Fuel atomizer assembly, combustion cap assembly and combustion liner assembly	3-25	3-38
Fuel boost pump	3-21	3-35
Fuel control fuel filter	3-19	3-35
Fuel control unit	3-24	3-38
Fuel solenoid valve	3-23	3-36
Fuel tank	3-22	3-36
General	3-15	3-32
Plenium drain valve	3-27	3-43
Tube assemblies, hose assemblies, clamps and plumbing	3-16	3-32
Fuel system	1-3, 4-1	1-1, 4-1
Fuel tank	3-22	3-36
Installation	3-22	3-36
Removal	3-22	3-36
Functional check procedure	3-8	3-18
Gas turbine engine	1-4	1-23
Exhaust gas temperatures	1-4	1-23
Fuel requirements	1-4	1-23
Lubrication requirements	1-4	1-23
Operating speeds	1-4	1-23
Gas turbine engine analyzer	3-8	3-18
Gas turbine engine controls and instruments	2-7	2-21
Battery charging ammeter	2-7	2-21

	Paragraphs	Page
Gas turbine engine controls and instruments—Continued		
Battery charging circuit breaker	2-7	2-21
Emergency operation indicator lamp	2-7	2-21
Emergency operation switch	2-7	2-21
Engine time totalizing meter	2-7	2-21
Engine time totalizing meter circuit breaker	2-7	2-21
Exhaust gas temperature indicator	2-7	2-21
Fuel boost pump switch	2-7	2-21
Fuel heater switch	2-7	2-21
Fuel line heater circuit breaker	2-7	2-21
Fuel line heater indicator lamp	2-7	2-21
General	2-7	2-21
Generator control circuit breaker	2-7	2-21
Master switch	2-7	2-21
Ready to load indicator lamp	2-7	2-21
Remote operation switch	2-7	2-21
Remote operation trip indicator lamp	2-7	2-21
Turbine engine control circuit breaker	2-7	2-21
Gas turbine engine identification plate	1-4	1-23
Gas turbine engine power plant	1-3	1-1
Pneumatic and shaft power gas turbine engine	1-3	1-1
Gas turbine engine power plant practical wiring diagram	1-4	1-23
General:		
Forms and records	1-2	1-1
Scope	1-1	1-1
General methods used to attain proper suppression	3-11	3-22
Generator control circuit breaker	2-7l	2-23
Description	2-7l	2-23
Purpose	2-7l	2-23
Ground connection	2-3	2-5
Heat range selector switch (two use, system no. 1 and no. 2)	3-58	3-65
Cleaning and inspection	3-58	3-65
Installation	3-58	3-65
Removal	3-58	3-65
Heated air system:		
Air pressure regulator	3-71	3-89
Air pressure regulator filter element	3-72	3-89
Bleed-air load-control valve	3-70	3-89
Flow control valve	3-74	3-91
General	3-69	3-86
Load control thermostat	3-73	3-89
Heated air system	1-3	1-1
Heated air system schematic	1-4	1-23
Heated air system selector switch	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
Heated air system temperature control (no. 1 system)	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
Heated air system temperature control (no. 2 system)	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
Heated air temperature control switch (two used, system no. 1 and no. 2)	3-58	3-65
Cleaning and inspection	3-58	3-65
Installation	3-58	3-65
Removal	3-58	3-65
Heating range selector switch (no. 1 system)	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24

	Paragraphs	Page
Heating range selector switch (no. 2 system)	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
Hoisting	2-4	2-12
Hot water pump control pressure switch failure	3-10	3-31
Hot water pump switch	2-8	2-23
Description	2-8	2-23
Purpose	2-8	2-23
Hot water valve	2-8	2-23
Description	2-8	2-23
Purpose	2-8	2-23
Identification and tabulated data	1-4	1-23
Identification	1-4	1-23
Battery charger	1-4	1-23
Compressor compartment stowable items label	1-4	1-23
Condenser fan (4 used)	1-4	1-23
Condensers (2 used)	1-4	1-23
Conditioned air outlet compartment stowable items label	1-4	1-23
Engine oil label	1-4	1-23
Evaporators (2 used)	1-4	1-23
Exhaust gas to water heat exchanger	1-4	1-23
Fuel inlet decal	1-4	1-23
Gas turbine engine identification plate	1-4	1-23
Oil fill door decal	1-4	1-23
Operating instructions decal	1-4	1-23
Power unit identification plate	1-4	1-23
Refrigerant receivers (2 used)	1-4	1-23
Refrigeration compressors (2 used)	1-4	1-23
Refrigeration label	1-4	1-23
Remote sensor decal	1-4	1-23
Turbine air inlet compartment stowable items label	1-4	1-23
Upper left condenser compartment stowable items label	1-4	1-23
Upper right condenser compartment stowable items label	1-4	1-23
Ventilating fans (4 used)	1-4	1-23
60 Hz generator	1-4	1-23
60 Hz voltage regulator	1-4	1-23
400 Hz generator	1-4	1-23
400 Hz voltage regulator	1-4	1-23
Igniter plug	3-48	3-53
Cleaning and inspection	3-48	3-53
Installation	3-48	3-53
Removal	3-48	3-53
Test	3-48	3-53
Ignition lead assembly	3-49	3-53
Cleaning and inspection	3-49	3-53
Installation	3-49	3-53
Removal	3-49	3-53
Test	3-49	3-53
Ignition unit	3-47	3-53
Cleaning and inspection	3-47	3-53
Installation	3-47	3-53
Removal	3-47	3-53
Test	3-47	3-53
Inspecting and servicing the equipment	2-1	2-1
Battery servicing	2-1	2-1
Fuel and lubrication system depreservation and servicing	2-1	2-1
Inspection	2-1	2-1
Inspection	2-1	2-1

	Paragraphs	Page
Instrument panel assembly	3-55	3-55
Circuit breaker (CB1, CB2, CB9)	3-55	3-55
Circuit breaker (CB5, CB11, CB12, CB22)	3-55	3-55
Exhaust gas temperature indicator (M9)	3-55	3-55
Lamp assembly (DS1, DS2, DS3, DS4, DS5, DS7, DS8, DS12, DS13, DS14, DS15, DS16, DS19, DS23)	3-55	3-55
Panel meter (M2, M3, M5, M6, M7, M8)	3-55	3-55
Push button switch (S23, S24)	3-55	3-55
Rotary switch (S14, S15, S16, S31)	3-55	3-55
Rotary switch (S25, S26)	3-55	3-55
Switch (S5)	3-55	3-55
Toggle switch (S1, S2, S3, S6, S7, S8, S9, S29, S30)	3-55	3-55
Instrument panel practical wiring diagram	1-4	1-23
Interference suppression components	3-12	3-32
Primary suppression components	3-12	3-32
Secondary suppression components	3-12	3-32
Lamp assembly (DS1, DS2, DS3, DS4, DS5, DS7, DS8, DS12, DS13, DS14, DS15, DS16, DS19, DS23)	3-55	3-55
Cleaning and inspection	3-55	3-55
Installation	3-55	3-55
Removal	3-55	3-55
Load contactor switch	2-10	2-30
Description	2-10	2-30
Purpose	2-10	2-30
Load contactor trip indicator lamp	2-10	2-30
Description	2-10	2-30
Purpose	2-10	2-30
Installation connections	2-3	2-5
Compressed air system connections	2-3	2-5
Conditioned air outlet compartment divider panel installation	2-3	2-5
Conditioned air system connections	2-3	2-5
External 24v dc auxiliary power source connections	2-3	2-5
Fuel supply connection	2-3	2-5
Ground connection	2-3	2-5
Remote fan operation connections	2-3	2-5
Standby operation connections	2-3	2-5
Vacuum system connection	2-3	2-5
Water system connections and priming	2-3	2-5
60 Hz power output connections	2-3	2-5
400 Hz auxiliary power connections	2-3	2-5
400 Hz power output connections	2-3	2-5
Installation of separately packed equipment	2-2	2-5
Installation or setting up instructions	2-3	2-5
Installation connections	2-3	2-5
Location	2-3	2-5
Instrument and control panel assemblies:		
Conditioned air system circuit breaker panel	3-56	3-60
Environment control panel assembly	3-57	3-64
General	3-53	3-54
Instrument panel assembly	3-55	3-55
Temperature control panel assembly	3-58	3-65
Wiring harness assemblies	3-54	3-54
Load control thermostat	3-8, 3-73	3-18, 3-89
Adjustment	3-73	3-89
Installation	3-73	3-89
Removal	3-73	3-89
Location	2-3	2-5
Low oil pressure switch	3-35	3-46
Cleaning and inspection	3-35	3-46

	Paragraphs	Page
Low oil pressure switch—Continued		
Installation	3-35	3-46
Removal	3-35	3-46
Test	3-35	3-46
Lower rack assembly	3-62	3-73
Relay (K1)	3-62	3-73
Relay (K11)	3-62	3-73
Relay (K16)	3-62	3-73
Relay (K33)	3-62	3-73
Relay (K34)	3-62	3-73
Transformer (two used)	3-62	3-73
Lubrication:		
Detailed lubrication information	3-4	3-1
General lubrication information	3-3	3-1
Lubrication requirements	1-4	1-23
Lubrication system:		
Cooling fan assembly	3-39	3-48
General	3-28	3-43
Low oil pressure switch	3-35	3-46
Oil filter element	3-30	3-43
Oil jet	3-36	3-46
Oil pump assembly	3-34	3-16
Oil scavenge pmp assembly	3-37	3-46
Oil tank assembly	3-38	3-48
Oil temperature bulb	3-33	3-45
Oil temperature regulator	3-40	3-48
Pressure relief valve	3-31	3-45
Regulator valve	3-41	3-48
Tachometer generator	3-32	3-45
Tube assemblies, hose assemblies, clamps, ducts, and plumbing fittings	3-29	3-43
Lubrication system	1-3, 4-1	1-1, 4-1
Main contactor switch	2-11	2-32
Description	2-11	2-32
Purpose	2-11	2-32
Main contactor trip indicator lamp	2-11	2-32
Description	2-11	2-32
Purpose	2-11	2-32
Master switch	2-7	2-21
Description	2-7	2-21
Purpose	2-7	2-21
Movement to new worksite:		
Dismantling for movement	2-4	2-12
Reinstallation after movement	2-5	2-16
New batteries	2-1	2-1
No. 1 system compressor reset button	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
No. 1 system compressor trip indicator lamp	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
No. 2 system compressor reset button	2-9l	2-26
Description	2-9l	2-26
Purpose	2-9l	2-26
No. 2 system compressor trip indicator lamp	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
Oil fill door decal	1-4	1-23

	Paragraphs	Page
Oil filter element	3-30	3-43
Cleaning and inspection	3-30	3-43
Installation	3-30	3-43
Removal	3-30	3-43
Oil jet	3-36	3-46
Cleaning and inspection	3-36	3-46
Installation	3-36	3-46
Removal	3-36	3-46
Oil pressure sequencing switch	3-46	3-51
Adjustment	3-46	3-51
Cleaning and inspection	3-46	3-51
Installation	3-46	3-51
Removal	3-46	3-51
Test	3-46	3-51
Oil pump assembly	3-34	3-46
Cleaning	3-34	3-46
Installation	3-34	3-46
Removal	3-34	3-46
Oil scavenge pump assembly	3-37	3-46
Installation	3-37	3-46
Removal	3-37	3-46
Oil tank assembly	3-38	3-48
Installation	3-38	3-48
Removal	3-38	3-48
Oil temperature bulb	3-33	3-45
Cleaning and inspection	3-33	3-45
Installation	3-33	3-45
Removal	3-33	3-45
Oil temperature regulator	3-40	3-48
Installation	3-40	3-48
Removal	3-40	3-48
Operating instructions decal	1-4	1-23
Operating speeds	1-4	1-23
Operation at high altitudes	2-24	2-56
Operation below sea level	2-25	2-56
Operation in dusty or sandy areas	2-19	2-55
Operation in extreme cold	2-17	2-54
Operation in extreme heat	2-18	2-55
Operation in mud	2-23	2-56
Operation in salt water areas	2-21	2-55
Operation in snow	2-22	2-55
Operation of auxiliary material used in conjunction with the equipment:		
Fire extinguisher	2-27	2-56
General	2-26	2-56
Operation of equipment	2-16	2-35
Emergency operation	2-16	2-35
Operation to deliver auxiliary 400 Hz power	2-16	2-35
Operation to deliver compressed air	2-16	2-35
Operation to deliver cooled air	2-16	2-35
Operation to deliver heated air	2-16	2-35
Operation to deliver hot and cold water	2-16	2-35
Operation to deliver ventilating air	2-16	2-35
Operation to deliver 60 Hz electrical power	2-16	2-35
Operation to deliver 400 Hz electrical power	2-16	2-35
Operation to provide vacuum suction	2-16	2-35
Remote operation to deliver ventilating air	2-16	2-35
Standby operation	2-16	2-35
Operation to deliver auxiliary 400 Hz power	2-16	2-35
Operation to deliver compressed air	2-16	2-35

	Paragraphs	Page
Operation to deliver cooled air	2-16	2-35
Operation to deliver heated air	2-16	2-35
Operation to deliver hot and cold water	2-16	2-35
Operation to deliver ventilating air	2-16	2-35
Operation to deliver 60 Hz electrical power	2-16	2-35
Operation to deliver 400 Hz electrical power	2-16	2-35
Operation to provide vacuum suction	2-16	2-35
Operation under rainy or humid condition	2-20	2-55
Operation under unusual conditions:		
Operation at high altitudes	2-24	2-56
Operation below sea level	2-25	2-56
Operation in dusty or sandy areas	2-19	2-55
Operation in extreme cold	2-17	2-54
Operation in extreme heat	2-18	2-55
Operation in mud	2-23	2-56
Operation in salt water areas	2-21	2-55
Operation in snow	2-22	2-55
Operation under rainy or humid conditions	2-20	2-55
Operation under usual condition:		
General	2-13	2-34
Operation of equipment	2-16	2-35
Starting	2-14	2-35
Stopping	2-15	2-35
Operator's and organizational maintenance repair parts, tools, and equipment:		
Organizational maintenance repair parts	3-2	3-1
Tools and equipment	3-1	3-1
Organizational maintenance repair parts	3-2	3-1
Other demolition methods	4-6	4-2
Burning	4-6	4-2
Scattering and concealment	4-6	4-2
Submersion	4-6	4-2
Output contactor switch	2-11	2-32
Description	2-11	2-32
Purpose	2-11	2-32
Output contactor trip indicator lamp	2-11	2-32
Description	2-11	2-32
Purpose	2-11	2-32
Overall dimensions and weights	1-4	1-23
Panel illumination lamp (conditioned air system circuit breaker panel)	2-9, 3-56	2-24, 3-60
Cleaning and inspection	3-56	3-60
Description	2-9	2-24
Installation	3-56	3-60
Purpose	2-9	2-24
Removal	3-56	3-60
Panel illumination lamp (receptacle panel assembly)	2-12, 3-63	2-34, 3-75
Cleaning and inspection	3-63	3-75
Description	2-12	2-34
Installation	3-63	3-75
Purpose	2-12	2-34
Removal	3-63	3-75
Panel illumination lamp (temperature control panel)	2-9, 3-58	2-24, 3-65
Cleaning and inspection	3-58	3-65
Description	2-9	2-24
Installation	3-58	3-65
Purpose	2-9	2-24
Removal	3-58	3-65
Panel illumination lamps (instrument panel)	2-9	2-24
Description	2-9	2-24

	Paragraphs	Page
Panel illumination lamps (instrument panel)—Continued		
Purpose	2-9	2-24
Panel lights switch	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
Panel meter (M2, M3, M4, M5, M6, M7, M8)	3-55	3-55
Cleaning and inspection	3-55	3-55
Installation	3-55	3-55
Removal	3-55	3-55
Plenum drain valve	3-27	3-43
Installation	3-27	3-43
Removal	3-27	3-43
Pneumatic and saft power gas turbine engine	1-3	1-1
Accessory drive section	1-3	1-1
Bleed air control system	1-3	1-1
Compressor and turbine section	1-3	1-1
Engine electrical system	1-3	1-1
Fuel system	1-3	1-1
Lubrication system	1-3	1-1
Power unit electrical system	1-3	1-1
24V dc electrical system	1-3	1-1
60 Hz electrical system	1-3	1-1
400 Hz electrical system	1-3	1-1
Power unit electrical system schematic	1-4	1-23
Power unit identification plate	1-4	1-23
Preparation for starting	2-14	2-35
Preparation for stopping	2-15	2-35
Preservation procedures	4-1	4-1
Batteries	4-1	4-1
Fuel system	4-1	4-1
Lubrication system	4-1	4-1
Pressure relief valve	3-31	3-45
Adjustment	3-31	3-45
Cleaning and inspection	3-31	3-45
Installation	3-31	3-45
Removal	3-31	3-45
Preventive maintenance checks and services:		
General	3-5	3-2
Preventive maintenance checks and services	3-6	3-3
Primary suppression components	3-12	3-32
Protective panel (two used) (upper rack assembly)	3-61	3-68
Cleaning and inspection	3-61	3-68
Installation	3-61	3-68
Removal	3-61	3-68
Test	3-61	3-68
Push button switch (S23, S24)	3-55	3-55
Cleaning and inspection	3-55	3-55
Installation	3-55	3-55
Removal	3-55	3-55
Radio interference suppression:		
General methods used to attain proper suppression	3-11	3-32
Interference suppression components	3-12	3-32
Replacement of suppression components	3-13	3-32
Testing of radio interference suppression components	3-14	3-32
Ready to load indicator lamp	2-7	2-21
Description	2-7	2-21
Purpose	2-7	2-21
Receptacle panel assembly	3-63	3-75
Cold weather heater and battery activation switch	3-63	3-75

	Paragraphs	Page
Receptacle panel assembly—Continued		
Fuel heater circuit breaker	3-63	3-75
Panel illumination lamp	3-63	3-75
Remote fan power input connector plug	3-63	3-75
Remote fan power output connector plug	3-63	3-75
Standby operation control connector plug	3-63	3-75
Water line heater circuit breaker	3-63	3-75
Water line heater connector plug	3-63	3-75
60 Hz convenience receptacle	3-63	3-75
60 Hz convenience receptacle circuit breaker (two used)	3-63	3-75
60 Hz power output receptacle (two used)	3-63	3-75
400 Hz auxiliary power receptacle (two used)	3-63	3-75
400 Hz convenience receptacle	3-63	3-75
400 Hz convenience receptacle circuit breaker	3-63	3-75
400 Hz power output receptacle (two used)	3-63	3-75
Recirculating air fan and fan shroud assembly	3-67	3-86
Installation	3-67	3-86
Removal	3-67	3-86
Recirculating fans and condenser fans circuit breakers (two of each used, system no. 1 and no. 2)	3-56	3-60
Cleaning and inspection	3-56	3-60
Installation	3-56	3-60
Removal	3-56	3-60
Recirculating fans circuit breaker (no. 1 system)	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
Recirculating fans circuit breaker (no. 2 system)	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
Refrigerant receivers (2 used)	1-4	1-23
Refrigeration compressors (2 used)	1-4	1-23
Refrigerant label	1-4	1-23
Regulator valve	3-41	3-48
Installation	3-41	3-48
Removal	3-41	3-48
Reinstallation after movement	2-5	2-16
Relay (K1) (lower rack assy)	3-62	3-73
Cleaning and inspection	3-62	3-73
Installation	3-62	3-73
Removal	3-62	3-73
Relay (K10) (upper rack assembly)	3-61	3-68
Cleaning and inspection	3-61	3-68
Installation	3-61	3-68
Removal	3-61	3-68
Relay (K11) (lower rack assy)	3-62	3-73
Cleaning and inspection	3-62	3-73
Installation	3-62	3-73
Removal	3-62	3-73
Relay (K12) (upper rack assembly)	3-61	3-68
Cleaning and inspection	3-61	3-68
Installation	3-61	3-68
Removal	3-61	3-68
Relay (K13) (upper rack assembly)	3-61	3-68
Cleaning and inspection	3-61	3-68
Installation	3-61	3-68
Removal	3-61	3-68
Relay (K15) (upper rack assembly)	3-61	3-68
Cleaning and inspection	3-61	3-68
Installation	3-61	3-68
Removal	3-61	3-68

	Paragraphs	Page
Relay (K16) (lower rack assy)	3-62	3-73
Cleaning and inspection	3-62	3-73
Installation	3-62	3-73
Removal	3-62	3-73
Relay (K33) (lower rack assy)	3-62	3-73
Cleaning and inspection	3-62	3-73
Installation	3-62	3-73
Removal	3-62	3-73
Relay (K34) (lower rack assy)	3-62	3-73
Cleaning and inspection	3-62	3-73
Installation	3-62	3-73
Removal	3-62	3-73
Relay armature (eight used, K19, K20, K21, K23, K24, K25, K26, K27)	3-57	3-64
Cleaning and inspection	3-57	3-64
Installation	3-57	3-64
Removal	3-57	3-64
Relay assembly (two used) (upper rack assembly)	3-61	3-68
Cleaning and inspection	3-61	3-68
Installation	3-61	3-68
Removal	3-61	3-68
Relay failure (K11, K12, K19, K20, K27, K43A, K43B)	3-10	3-31
Relay, time delay (two used, K17, K18)	3-57	3-64
Cleaning and inspection	3-57	3-64
Installation	3-57	3-64
Removal	3-57	3-64
Remote fan operation connections	2-3	2-5
Remote fan power input connector plug	3-63	3-75
Cleaning and inspection	3-63(2)	3-75
Installation	3-63(3)	3-75
Removal	3-63 (1)	3-75
Remote fan power output connector plug (two used)	3-63	3-75
Cleaning and inspection	3-63(2)	3-75
Installation	3-63(3)	3-75
Removal	3-63(1)	3-75
Remote operation switch	2-7	2-21
Description	2-7(1)	2-21
Purpose	2-7(2)	2-21
Remote operation to deliver ventilating air	2-16	2-35
Remote operation trip indicator lamp	2-7	2-21
Description	2-7	2-21
Purpose	2-7	2-21
Remote sensor decal	1-4	1-23
Repairs	3-10	3-31
Cold water pressure switch failure	3-10	3-31
Door interlock switch failure	3-10	3-31
Hot water pump control pressure switch failure	3-10	3-31
Relay failure (K11, K12, K19, K20, K27, K43A, K43B)	3-10	3-31
Start relay (K1) failure	3-10	3-31
Replacement of suppression components	3-13	3-32
Reverse polarity indicating lamp	2-12	2-34
Description	2-12	2-34
Purpose	2-12	2-34
Rotary switch (S14, S15, S16, S31)	3-55	3-55
Cleaning and inspection	3-55	3-55
Installation	3-55	3-55
Removal	3-55	3-55
Rotary switch (S25, S26)	3-55	3-55
Cleaning and inspection	3-55	3-55
Installation	3-55	3-55

	Paragraph	Page
Rotary switch (S25, S26)—Continued		
Removal	3-55	3-55
Scattering and concealment	4-6	4-2
Scope	1-1	1-1
Secondary suppression components	3-12	3-32
Service upon receipt of material:		
Inspecting and servicing the equipment	2-1	2-1
Installation of separately packed equipment	2-2	2-5
Installation or setting up instructions	2-3	2-5
Shipment	2-4, 4-2	2-12, 4-1
Shipment and limited storage:		
Preservation procedures	4-1	4-1
Shipment and storage	4-2	4-1
Shipment and storage	4-2	4-1
Shipment	4-2	4-1
Storage	4-2	4-1
Shunt	3-61	3-68
Cleaning and inspection	3-61	3-68
Installation	3-61	3-68
Removal	3-61	3-68
Skidding	2-4	2-12
Standby operation	2-16	2-35
Standby operation connections	2-3	2-5
Standby operation control connector plug	3-63	3-75
Cleaning and inspection	3-63	3-75
Installation	3-63	3-75
Removal	3-63	3-75
Start relay (K1) failure	3-10	3-31
Starting	2-14	2-35
Preparation for starting	2-14	2-35
Starting	2-14	2-35
Static check of components	3-8	3-18
Stopping	2-15	2-35
After stopping procedures	2-15	2-35
Preparation for stopping	2-15	2-35
Stopping	2-15	2-35
Storage	4-2	4-1
Stowage of accessory components	2-4	2-12
Submersion	4-6	4-2
Switch (S5)	3-55	3-55
Cleaning and inspection	3-55	3-55
Installation	3-55	3-55
Removal	3-55	3-55
Tabulated data	1-4	1-23
Compressed air system	1-4	1-23
Conditioned air system	1-4	1-23
Conditioned air system practical wiring diagram	1-4	1-23
Cooled air system	1-4	1-23
Engine electrical system schematic	1-4	1-23
Engine fuel and bleed air control systems schematic	1-4	1-23
Engine lubrication system schematic	1-4	1-23
Gas turbine engine	1-4	1-23
Gas turbine engine power plant practical wiring diagram	1-4	1-23
Heated air system schematic	1-4	1-23
Instrument panel practical wiring diagram	1-4	1-23
Overall dimensions and weight	1-4	1-23
Power unit electrical system schematic	1-4	1-23
Vacuum system	1-4	1-23
Water system	1-4	1-23

	Paragraphs	Page
Tabulated data—Continued		
Water system practical wiring diagram	1-4	1-23
Water system schematic	1-4	1-23
24v dc electrical system	1-4	1-23
60 Hz electrical system	1-4	1-23
400 Hz electrical system	1-4	1-23
Tachometer generator	3-32	3-45
Installation	3-32	3-45
Removal	3-32	3-45
Temperature control panel assembly	3-58	3-65
Cooled air lamp assembly (two used, system no. 1 and no. 2)	3-58	3-65
Cooled air temperature control switch (two used, system no. 1 and no. 2)	3-58	3-65
Heated air temperature control switch (two used, system no. 1 and no. 2)	3-58	3-65
Heating range selector switch (two used, system no. 1 and no. 2)	3-58	3-65
Panel illumination lamp	3-58	3-65
Terminal board (two used) (upper rack assembly)	3-61	3-68
Cleaning and inspection	3-61	3-68
Installation	3-61	3-68
Removal	3-61	3-68
Terminal strip (environment control panel)	3-57	3-64
Cleaning and inspection	3-57	3-64
Installation	3-57	3-64
Removal	3-57	3-64
Testing of radio interference suppression components	3-14	3-32
Thermal relay (three used) (upper rack assembly)	3-61	3-68
Cleaning and inspection	3-61	3-68
Installation	3-61	3-68
Removal	3-61	3-68
Thermal relay (three used) (environment control panel)	3-57	3-64
Cleaning and inspection	3-57	3-64
Installation	3-57	3-64
Removal	3-57	3-64
Time totalizing meter (gas turbine engine)	3-50	3-54
Installation	3-50	3-54
Removal	3-50	3-54
Time totalizing meter (two used, system no. 1 and no. 2)	3-56	3-60
Cleaning and inspection	3-56	3-60
Installation	3-56	3-60
Removal	3-56	3-60
Time totalizing meter circuit breaker (two used, system no. 1 and no. 2)	3-56	3-60
Cleaning and inspection	3-56	3-60
Installation	3-56	3-60
Removal	3-56	3-60
Time totalizing meter circuit breaker (no. 1 system)	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
Time totalizing meter circuit breaker (no. 2 system)	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
Toggle switch (S1, S2, S3, S6, S7, S8, S9, S29, S30)	3-55	3-55
Cleaning and inspection	3-55	3-55
Installation	3-55	3-55
Removal	3-55	3-55
Tools and equipment	3-1	3-1
Training	4-7	4-2
Transformer (two used) (lower rack assy)	3-62	3-73
Cleaning and inspection	3-62	3-73
Installation	3-62	3-73
Removal	3-62	3-73

	Paragraphs	Page
Transformer 400 Hz (three used) (upper rack assembly)	3-61	3-68
Cleaning and inspection	3-61	3-68
Installation	3-61	3-68
Removal	3-61	3-68
Troubleshooting:		
General	3-7	3-3
Using gas turbine engine analyzer during troubleshooting	3-8	3-18
Tube assemblies and plumbing fillings (water system)	3-76	3-91
Cleaning and inspection	3-76	3-91
Installation	3-76	3-91
Removal	3-76	3-91
Tube assemblies, hose assemblies, clamps, and plumbing fittings (fuel system)	3-16	3-32
Cleaning and inspection	3-16	3-32
Installation	3-16	3-32
Removal	3-16	3-32
Tube assemblies, hose assemblies, clamps, ducts, and plumbing fittings (lubrication system)	3-29	3-43
Cleaning and inspection	3-29	3-43
Installation	3-29	3-43
Removal	3-29	3-43
Turbine air inlet compartment stowable items labels	1-4	1-23
Turbine engine control circuit breaker	2-7	2-21
Description	2-7	2-21
Purpose	2-7	2-21
Unloading	2-4	2-12
Upper left condenser compartment stowable items label	1-4	1-23
Upper rack assembly	3-61	3-68
Battery charger	3-61	3-68
Protective panel (two used)	3-61	3-68
Relay (K10)	3-61	3-68
Relay (K12)	3-61	3-68
Relay (K13)	3-61	3-68
Relay (K15)	3-61	3-68
Relay assembly (two used)	3-61	3-68
Shunt	3-61	3-68
Terminal board (two used)	3-61	3-68
Thermal relay (three used)	3-61	3-68
Transformer 400 Hz (three used)	3-61	3-68
Voltage regulator (60 Hz)	3-61	3-68
Voltage regulator (400 Hz)	3-61	3-68
Upper right condenser compartment stowable items label	1-4	1-23
Used batteries	2-1	2-1
Using gas turbine engine analyzer during troubleshooting	3-8	3-18
Adjustments	3-8	3-18
Connection of gas turbine engine analyzer to power unit	3-8	3-18
Functional check procedure	3-8	3-18
Gas turbine engine analyzer	3-8	3-18
Static check of components	3-8	3-18
Vacuum system	1-3, 1-4	1-1, 1-23
Vacuum system connections	2-3	2-5
Ventilating air system	1-3	1-1
Ventilating fans (2 used)	1-4	1-23
Ventilating system selector switch	2-9	2-24
Description	2-9	2-24
Purpose	2-9	2-24
Volt-amp selector switch (60 Hz)	2-10	2-30
Description	2-10	2-30
Purpose	2-10	2-30

	Paragraphs	Page
Volt-amp selector switch (400 Hz)	2-11	2-32
Description	2-11	2-32
Purpose	2-11	2-32
Voltage regulator (60 Hz)	3-61	3-68
Cleaning and inspection	3-61	3-68
Installation	3-61	3-68
Removal	3-61	3-68
Test	3-61	3-68
Voltage regulator (400 Hz)	3-61	3-68
Cleaning and inspection	3-61	3-68
Installation	3-61	3-68
Removal	3-61	3-68
Test	3-61	3-68
Water line heater circuit breaker	3-63	3-75
Cleaning and inspection	3-63	3-75
Installation	3-63	3-75
Removal	3-63	3-75
Water line heater connector plug (two used)	3-63	3-75
Cleaning and inspection	3-63	3-75
Installation	3-63	3-75
Removal	3-63	3-75
Water system:		
General	3-75	3-91
Tube assemblies and plumbing fittings	3-76	3-91
Water system components	3-77	3-91
Water system	1-3, 1-4	1-1, 1-23
Water system components	3-77	3-91
Installation	3-77	3-91
Removal	3-77	3-91
Water system connections and priming	2-3	2-5
Water system controls	2-8	2-23
Cold water pump switch	2-8	2-23
Cold water valve	2-8	2-23
General	2-8	2-23
Hot water pump switch	2-8	2-23
Hot water valve	2-8	2-23
Water system practical wiring diagram	1-4	1-23
Water system schematic	1-4	1-23
Water line heaters circuit breaker	2-12	2-34
Description	2-12	2-34
Purpose	2-12	2-34
Wheeled transporter	2-4	2-12
Wiring harness assembly (engine electrical system)	3-43	3-50
Cleaning and inspection	3-43	3-50
Installation	3-43	3-50
Removal	3-43	3-50
Repair	3-43	3-50
Test	3-43	3-50
Wiring harness assemblies (instrument and control panel assemblies)	3-54	3-54
Cleaning and inspection	3-54	3-54
Installation	3-54	3-54
Removal	3-54	3-54
Repair	3-54	3-54
Test	3-54	3-54
Wiring harness assemblies, terminals, electrical leads, wiring, connectors, and receptacles (400 Hz and 60 Hz electrical systems)	3-60	3-67
Cleaning and inspection	3-60	3-67
Installation	3-60	3-67
Removal	3-60	3-67

	Paragraphs	Page
Wiring harness assemblies, terminals, electrical leads, wiring, connectors, and receptacles (400 Hz and 60 Hz electrical systems)—Continued		
Repair	3-60	3-67
Test	3-60	3-67
24v dc electrical system	1-3, 1-4	1-7, 1-23
60 Hz convenience receptacle	3-63	3-75
Cleaning and inspection	3-63	3-75
Installation	3-63	3-75
Removal	3-63	3-75
60 Hz convenience receptacle circuit breaker	2-12, 3-63	2-34, 3-75
Cleaning and inspection	3-63	3-75
Description	2-12	2-34
Installation	3-63	3-75
Purpose	2-12	2-34
Removal	3-63	3-75
60 Hz electrical system	1-3, 1-4	1-1, 1-23
60 Hz electrical system controls and instruments	2-10	2-30
AC ammeter	2-10	2-30
AC voltmeter	2-10	2-30
Frequency meter	2-10	2-30
General	2-10	2-30
Load contactor switch	2-10	2-30
Load contactor trip indicator lamp	2-10	2-30
Volt-amp selector switch	2-10	2-30
60 Hz generator	3-65	3-82
Installation	3-65	3-82
Removal	3-65	3-82
Test	3-65	3-82
60 Hz power output connections	2-3	2-5
60 Hz power output receptacle (two used)	3-63	3-75
Cleaning and inspection	3-63	3-75
Installation	3-63	3-75
Removal	3-63	3-75
60 Hz voltage regulator	1-4	1-23
400 Hz and 60 Hz electrical systems:		
General	3-59	3-67
Lower rack assembly	3-62	3-73
Receptacle panel assembly	3-63	3-75
Upper rack assembly	3-61	3-67
Wiring harness assemblies, terminals, electrical leads, wiring, connectors, and receptacles	3-60	3-67
60 Hz generator	3-65	3-82
400 Hz generator	3-64	3-81
400 Hz auxiliary power connections	2-3	2-5
400 Hz auxiliary power receptacles (two used)	3-63	3-75
Cleaning and inspection	3-63	3-75
Installation	3-63	3-75
Removal	3-63	3-75
400 Hz convenience receptacle	3-63	3-75
Cleaning and inspection	3-63	3-75
Installation	3-63	3-75
Removal	3-63	3-75
400 Hz convenience receptacle circuit breaker	2-12, 3-63	2-34, 3-75
Cleaning and inspection	3-63	3-75
Description	2-12	2-34
Installation	3-63	3-75
Purpose	2-12	2-34
Removal	3-63	3-75
400 Hz electrical system	1-3, 1-4	1-1, 1-23

	Paragraphs	Page
400 Hz electrical system controls and instruments	2-11	2-32
AC ammeter	2-11	2-32
AC voltmeter	2-11	2-32
Frequency meter	2-11	2-32
General	2-11	2-32
Main contactor switch	2-11	2-32
Main contactor trip indicator lamp	2-11	2-32
Output contactor switch	2-11	2-32
Output contactor trip indicator lamp	2-11	2-32
Volt-amp selector switch	2-11	2-32
400 Hz generator	1-4, 3-64	1-23, 3-81
Removal	3-64	3-81
Test	3-64	3-81
400 Hz power output connections	2-3	2-5
400 Hz power output receptacles (two used)	3-63	3-75
Cleaning and inspection	3-63	3-75
Installation	3-63	3-75
Removal	3-63	3-75
400 Hz voltage regulator	1-4	1-23

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

Distribution:

To be distributed in accordance with DA Form 12-25, Section IV (qty rqr block no. 750) organizational maintenance requirements for Generator Sets, 100 KW, 60 Cycle.

☆ U. S. GOVERNMENT PRINTING OFFICE : 1990 0 - 278-948

PIN : 025650-000